TRAFFIC ENGINEERING

OFFICIAL PUBLICATION OF THE INSTITUTE OF TRAFFIC ENGINEERS

An example of channelization at the approach to a bridge is shown in the cover photograph. (Ninth St. bridge, Washington, D. C. Courtesy of John Mitton.)

May We Offer . . .

Concrete Guard Rails	**P. T. Hull**	**147**
Arlington Highway Plans	**C. G. Stoneburner**	**150**
Plans from New Zealand	**A. E. Forsyth**	**154**
Speed Zoning in Kansas	**Bryan Wilson**	**157**
Merits of Polarization	**LeVerne Johnson**	**160**
Protecting the Pedestrian	**E. H. Miller**	**163**
Traffic and Parking Predicament	**H. W. Osborne**	**165**
OD Parking Study	**V. L. Johnson**	**170**
Traffic Engineer's Quiz	**M. C. Stark**	**179**
Transit Needs	**W. R. Pollard**	**186**
Reference Notes		**192**
ITE Activities		**194**

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Entered as second class matter November 7, 1941, at the Post Office at Plainfield, New Jersey under Act of March 3, 1879.

TRAFFIC ENGINEERING is published monthly by the Institute of Traffic Engineers at 400 Watchung Avenue, Plainfield, New Jersey. Editorial Offices, 2312 North Vernon, Arlington, Virginia. Business Office, Strathcona Hall, New Haven 11, Connecticut. Permission to reprint contents with customary credit line is given unless otherwise stated.

Single copies 20c, subscription price $2.00 per year in the United States. Other publications of the Institute of Traffic Engineers include the Annual Proceedings, and Traffic Engineering Handbook.

VOLUME XVIII **JANUARY, 1948** **NUMBER 4**

Frankly Speaking

TIME MAGAZINE, which likes to believe it has its finger on the nation's pulse, ran a satire on traffic engineering in form of a story entitled "The Last Traffic Jam" (December 15, 1947). *Time*, in a somewhat typical tabloid manner, believes the traffic problem will not end for good until the day of the last jam—"at that shrieking moment when every highway, street, road and lane in the nation was so clogged with cars that none could ever move again."

"We're beat", *Time* quotes a New York taxi driver after describing the the difficulty of touring New York's garment district where *"it often takes 15 minutes to go a block . . ."* (as compared to 15 miles in 15 minutes in Texas!)

Time researchers apparently don't read their own publications. Only recently did Fortune magazine analyze New York's traffic problems and point out how New Yorkers felt traffic jams were an indication of good business. Nor is *Time* apparently aware of the fact that there are fewer people per car in Los Angeles than there are in New York City.

Time forgets that any "new" invention necessarily alters certain habits. Our desire to adjust ourselves to these changes measures our ability to aid in building a better world. In most parts of America, Americans have demonstrated such desire with a result that traffic facilities are now available to cope with "the problem".

Time's satire might be entirely humorous were it not for their statement "Congress and state legislatures had appropriated millions to build super highways on which speeders could kill themselves at higher speeds." Frankly, we don't know what a "super highway" is, nor have we any statistics which indicate that accidents are now involving higher speeds. The expressways and parkways, which *Time* might consider "super highways" are among the safest traffic facilities in existence.

Poor *Time* forgets the contribution of highway transport to the economy of the United States. *Time* ignores the role of highway transport in winning the war. And, poor *Time* neglects to remind itself that its vast circulation is dependent on the distribution made possible by the motor vehicle.

Shame on *Time* for such a quack diagnosis.

Robert O. Swain

Editor

Concrete Guard Rails

by P. T. HULL

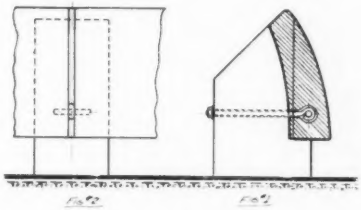
IN the studies and investigations being conducted by many governmental and private agencies for the improvement and expansion of our national highway system, it would be very desirable to consider also the importance of added safety through the selection of an adequate type of guard rail.

In earlier days, the main objective in placing guard rails along embankments and on curves of highways was primarily to prevent vehicles from leaving the road in case of accident or loss of control. In recent years, attempt has been made to make the guard rail also serve to guide the vehicle after it runs into the rail.

Denmark Design

A safety guard rail to accomplish this dual purpose was designed and patented in Denmark ten years ago by Svend A. Rasmussen, Contractor and Builder, in the town of Silkeborg. Very little information of this improvement has been available in the United States up to this time. During the past decade this guard rail has gained considerable attention for its safety features through many public demonstrations and in every day use throughout Denmark. This patented safety fence, known as the "Danish Auto Guard" has now been placed on highways in Belgium, Holland, Norway and Sweden as well.

The safety fence consists of the guard rail attached to posts spaced 6 feet apart (center to center). Both the rail and the posts are made of reinforced concrete, with the rail supplied in sections of 6 feet in length to equal the spacing of the posts. When initially placed, the posts are so set that some movement is permissible to obtain alignment when making final installation of the rail. The outer surface of the guard rail is convex in shape as shown in Figure 1.



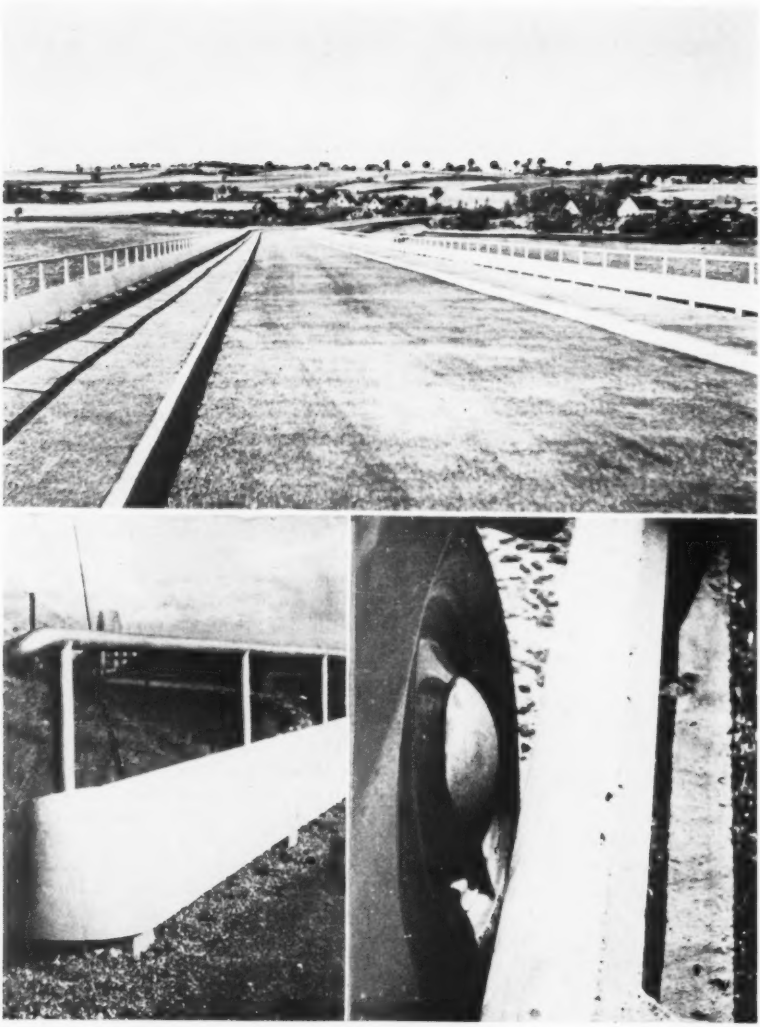
The inner surface of the guard rail and the supporting surface on the post to which the rail is attached are so curved as to make perfect mating surfaces. Attachment of the rail to the post is accomplished by means of a steel anchorbolt and steel pin. The post has a shoulder approximately 4 inches above the ground which supports the bottom of the guard rail.

No Paint Required

The rails are placed end to end on the shoulders of the posts so that the joint occurs at the middle of the post. The ends of each rail possess matching holes into which is inserted a short steel pin, passing through the anchorbolt, as shown in Figure 2. The surface of the guard rail has a very smooth and hard finish of white cement, applied during the forming process. This eliminates the problem of costly maintenance, such as painting. To make the white surface of the guard rail more visible against a snowy background, cross striping in black paint has been found to be effective.

The safety fence is erected in the following manner:

The posts are spaced 6 feet apart



(center to center) along the sides of the highway. Anchorbolts are then inserted in two adjoining posts and the first length of guard rail placed in position between these bolts, and the steel pins inserted at both ends of the guard rail, through the anchorbolts, so as to hold the rail in place. Then the second rail section is placed in position, and so on, until the entire stretch of fence has been erected. After proper alignment of posts and rails has been accomplished, anchorbolts are tightened and the posts can

then be firmly fixed in the ground. The joints between the rails are then filled with concrete and finished off

smoothly in white cement so that the guard rail presents an unbroken surface.

Serves As Guide

In the finished position, the guard rail projects beyond the shoulders of the posts with the lower edge of the rail so situated that the front wheel of a vehicle coming off the road will come in contact with the edge at a point 4 inches above the outer periphery of the tire. When this happens, first the front wheel and then the rear wheel will be forced in line with the rail. The friction created by both tires sliding along the surface of the guard rail will gradually reduce the speed of the vehicle. During the time the speed is being reduced to a standstill, the fence so guides and directs the forward motion of the vehicle even though there is no driver control.

Summarizing, the principal features are:

1. The convex construction gives the rail the utmost strength in resisting bending.
2. The immediate point of contact between the rail and a motor vehicle being only 4 inches above the ground, the rail avoids contact with wheel hubs and fenders under normal conditions.
3. In more severe cases of collision between motor vehicle and guard rail, the impact may be sufficiently strong to tilt the vehicle. In such cases, hub caps and fenders will also be brought into contact with the upper portion of the guard rail, thereby minimizing the possibility of the vehicle overturning.
4. There is a complete absence of any obstructions that might bring the vehicle to a sudden stop, thereby throwing it out of control.

H. S. Fairbank, deputy commissioner, the Public Roads Administration, chairman of the Highway Research Board's Committee on Economics of Motor Vehicle Size and Weight, has reported plans for study in 1948 of the operation of heavy motor vehicles on highways traversing the mountainous section of southwestern Pennsylvania. The planned research program of the committee is designed to establish the ultimate economy of highway transportation, considering both the cost of motor vehicle operation and cost of road provision at design standards and capacities necessary to accommodate the various levels of size and weight under investigation. Comparative studies will be made on test vehicles traveling over the Pennsylvania Turnpike, a divided limited access highway, and U. S. 30 and 11, roads of two-lane width having many curves and steep grades. Test vehicles for the first phase of the study will consist of two trucks, three truck-tractors, semi-trailer combinations, a truck and full trailer combination, and a double combination of truck-tractor, semi-trailer and trailer. Each of the trucks will be variously loaded.

Arlington Highway Plans

by CLIFTON G. STONEBURNER, *Member, ITE*

ARLINGTON COUNTY, VIRGINIA, a community of 23 square miles in area and over 130,000 population located across the Potomac River from Washington, D. C., has, during recent years, made considerable progress in the construction of express highways. The Pentagon Building and its network of highways is within this area. Additional construction is now being planned to provide a complete, modern system of expressways and major thoroughfares.

The first major construction was Lee Boulevard (U. S. 50) which was completed in 1937 through the joint efforts of the Virginia Department of Highways and Arlington County. It has a right-of-way with a minimum width of two hundred feet and extends through the central part of the county to form a section of an inner loop or distributor (see map). The remainder of Lee Boulevard is an extremely important radial highway leading out into Fairfax County. The construction in 1937 consisted of two twenty foot roadways with a twenty foot median strip. Part of the project completed earlier was four lanes without a center strip.

Master Plan

Shortly afterward, a study was started as a basis for a complete major thoroughfare system for the entire Country. The report was completed in 1941.

One of the outstanding features proposed in the report was the inner loop plan for a circulatory highway system passing around Arlington National Cemetery as shown in Fig. 1. It is not a true circle, but a large

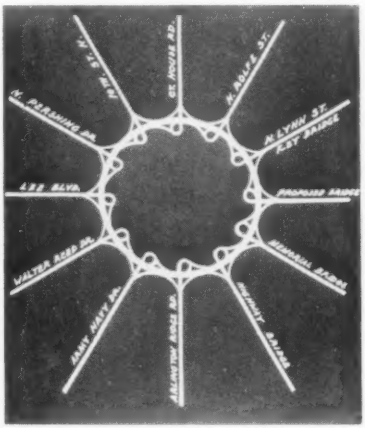
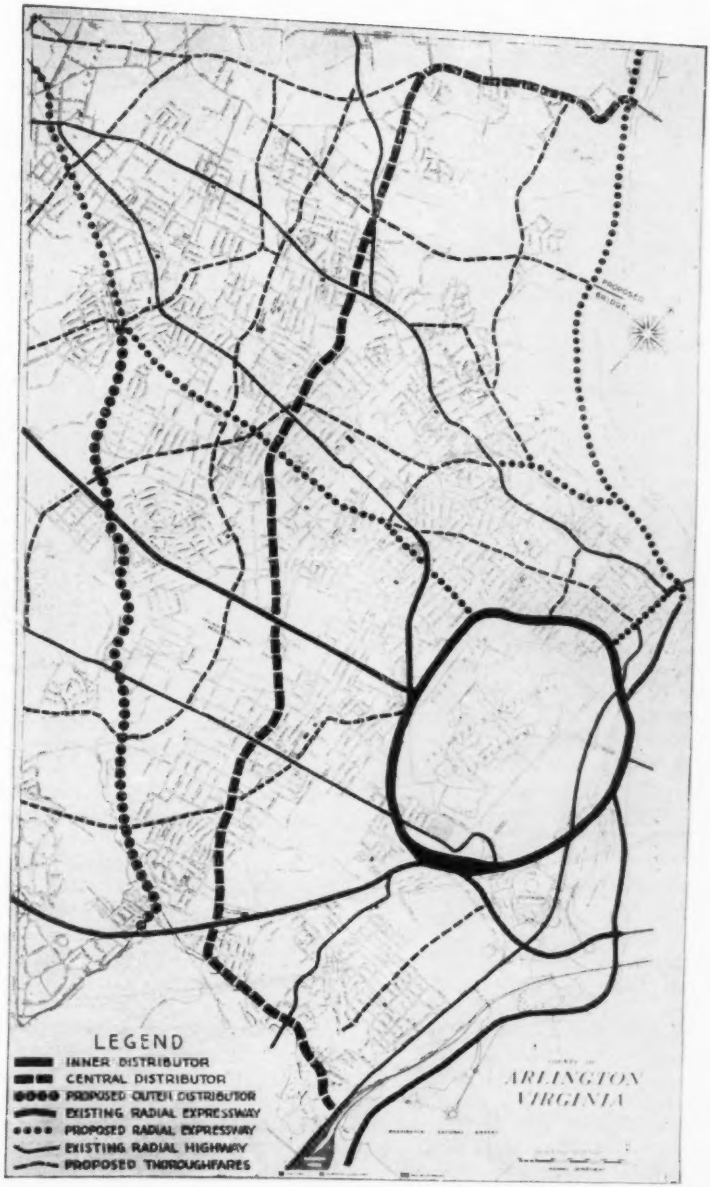


Fig. 1.
Diagrammatic plan of Arlington Cemetery—Federal Property. Circulatory Highway System with radial connections.

rotary with an average diameter of approximately 1.6 miles. It will ultimately have no grade crossings; in fact, it now has 11 grade separation structures including one (1) 3 level bridge (Fig. 2) where Shirley Memorial Highway, a controlled access radial highway, intersects the loop. One additional grade separation structure is under construction and plans are being prepared for two (2) more.

The thoroughfare plan includes radial highways from this loop and for other important distributors and cross-county highways. The 1941 report included a new location for U. S. 1 from Washington to Woodbridge, Virginia, approximately 18 miles south. The proposed new route was then called Army-Navy Drive and was planned to by-pass Alexandria and save considerable time and distance. This controlled access facility, now known as Shirley Memorial Highway,

Mr. Stoneburner is Highway Engineer for Arlington County, Virginia.


LEGEND
INNER DISTRIBUTOR
CENTRAL DISTRIBUTOR
PROPOSED OUTER DISTRIBUTOR
EXISTING RADIAL EXPRESSWAY
PROPOSED RADIAL EXPRESSWAY
EXISTING RADIAL HIGHWAY
PROPOSED THOROUGHFARES
ARLINGTON
VIRGINIA

is partly completed and in use and additional construction is underway.

Construction Expedited

Even in 1941 it was thought that many years would be required before any major part of the plan could be realized. However, The Pentagon, the world's largest office building, was started almost immediately after the report was submitted and early in 1942 The Pentagon network of highways was started.

The first major job in the project was to complete the southern and incompleted half of the inner loop. Connections and necessary interchanges were provided for Washington Boulevard, Lee Boulevard, Columbia Pike (State Highway 244), Arlington Ridge Road, U. S. 1, Highway Bridge, Memorial Bridge, George Washington Memorial Parkway, Boundary Drive, and the proposed Shirley Memorial Highway, involving the three-level structure already mentioned.

Shortly after these roadways were completed, it was necessary to provide access to an apartment project, Fairlington, (approximately 3500 units). Since the proposed location of Shirley Memorial Highway passes between the north and south sections of this housing development, a section of the highway was constructed to provide the necessary access, and ultimately to be a part of the proposed alternate U. S. 1 previously mentioned.

Controlled Access

All of these projects are controlled access construction with modern facilities to improve traffic conditions. In fact, speed limits of 40 to 50 miles per hour are allowed with safety on these roadways through this urban community.

Recently, the Virginia Department of Highways has been planning the construction on two additional important parts of its highway system. Glebe Road, which is a very narrow two-lane highway, has served as a cross-county distributor. Traffic volumes on it have increased to and beyond capacity and plans are now being prepared for a four-lane highway with four-foot median strip, and sidewalks, curbs and gutters. This route is a central distributor within the county and intersects all the radial highways. At Glebe Road and Shirley Highway, a grade separation now exists. At U. S. 50, plans are being prepared for another grade separation, and adequate channelization, turning lanes, bus turnouts, etc., will be provided at other major intersections.

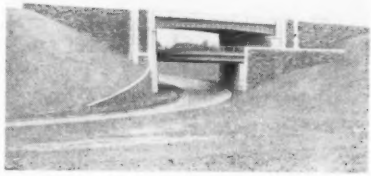


Fig. 2
The 3-level structure at the intersection of Henry G. Shirley Memorial Highway and Washington Boulevard (Inner distributor).

Improvements for Glebe Road

Construction on the first section of the new Glebe Road improvement between Columbia Pike and Shirley Highway is expected to start in the near future. Approximately $580,000.00 is now available for the project. An additional appropriation of $195,000.00 for the 1948-49 fiscal year has been made to extend this construction to U. S. 1.

Construction of Fairfax Drive, an important radial highway, is expected to start soon. This route follows the abandoned right of way of the Arlington and Fairfax Railroad Co. for the most of its length. Plans are now being completed, and a grade separation is planned at U. S. 50 where this route leaves the inner distributor. Fairfax Drive will provide a by-pass around the Clarendon business area.

A border road is planned in order to control access from adjacent property, and plans for channelization of several important intersections are included. Plans call for two lanes in each direction with a median strip from four feet to twenty feet in width, with curb and gutter and sidewalk. Arlington's three-year share of Federal funds under the Federal Highway Act of 1944, and the State's matching funds, amounting to over $500,000.00, will be used for the first part of this project.

Outer Distributor

An outer distributor is planned to follow the valley of Four Mile Run, one of the major streams in the county, and the Washington and Old Dominion Railroad. As new subdivisions have been developed, the needed rights of way have been provided and part of the ultimate construction completed. Several sections of considerable length have been opened and it is expected that several of these will be connected soon to provide distributors between several radial highways.

The thoroughfare plan also calls for thoroughfares at approximately one-half mile intervals between cross-county distributors and radial highways. Developers of new subdivisions have provided for many miles of cross-county, radial and distributor thoroughfares. New construction and reconstruction by the county have conformed to this plan. For example, a thousand-foot section of an old thirty-foot highway that was a part of the plan had to be rebuilt, and the new section recently completed provided two thirty-foot roadways, two eleven-foot lanes plus parking lane, with a median strip four feet wide, sidewalk, curb and gutter. Construction plans are now being made to extend this route approximately one-half mile further along an old railroad right of way to South Glebe Road.

Last year a similar project resulted in the completion of a section of another cross-county route. This one had four lanes with a twenty-foot median.

The Virginia Department of Highways controls seven highways, totaling approximately thirty-two miles, all of which are an important part of the plan. In the State's twenty-year plan the minimum standard for all of the mileage provides for four-lane divided highways. All construction in recent years by the State has conformed to this plan.

With all of this planned and completed work, Arlington can look forward to a modern express and thoroughfare system of highways.

PRESENTS ELGIN REPORT

Traffic accidents in Elgin, Ill., are costing the persons involved over $16,700 a month in direct "out of the pocket" payments, city officials were told recently in a report delivered by J. A. Carrothers, acting director of traffic engineering for the National Conservation Bureau.

Mr. Carrothers turned over to Mayor Walter E. Miller a 55-page report on the traffic ills causing undue congestion and a large number of serious accidents in Elgin.

In the first eight months of 1947 there were 758 reported traffic accidents in Elgin, Mr. Carrothers said. Four of these resulted in death and 111 in injury to drivers, passengers and pedestrians. Total direct cost of the accidents was $133,300.

C. J. TILDEN, HON. MEM.,
DISCUSSES
London Traffic
IN THE FEBRUARY
Traffic Engineering

Plans from New Zealand

by A. E. Forsyth, *Assoc. Mem. ITE*

New Zealand claims to have the safest roads of any of the motorized countries. With one motor vehicle for every six persons, and each vehicle burning over 300 gallons of petrol in a year, New Zealand is second only to United States of America in ownership and utilization of the motor vehicle.

Traffic is distributed over 50,000 miles of road and daily volumes do not exceed 10,000 vehicles on any highway. Less than 200 miles of highway carry volumes of traffic in excess of 1,000 vehicles during an average day, while the State Highway system of nearly 4,000 miles averages only 400 motor vehicles per day.

The largest cities have populations in the 100,000-200,000 group and have recorded volumes up to 17,000 vehicles daily with peaks reaching 2,800 per hour.

With a population of less than 2 million people New Zealand cannot support an ambitious road system to meet traffic needs that are far in advance of those of present day traffic volumes. Consequently there are few highways of more than two lanes and the separation of grades at intersections is a dream of the future. Many of the grade crossings with the railways have been eliminated but there are still very many of these where a definite hazard exists.

Lighting Is Poor

Street lighting is deplorably inadequate as an aid to traffic, and highway lighting is non-existent. About 20% of traffic moves at night but over 50% of the fatalities and serious accidents occur in hours of darkness.

There are as many bicycles as motor vehicles but cycle traffic has to share the roadway with the motor vehicle. Footpaths do not extend as far as the settled areas and the pedestrian from villages and seaside resorts is obliged to walk on the highway.

Thus it is seen that the hazards of the road are considerable. Yet we kill only 6 people per 10,000 motor vehicles in a year compared with 10 in United States of America, 17 in Britain and 12 in Australia. Our death rate per million gallons of petrol used has dropped steadily from 3.22 in 1930 to 3.19 in 1935 to 2.75 in 1940 to 1.97 in 1945.

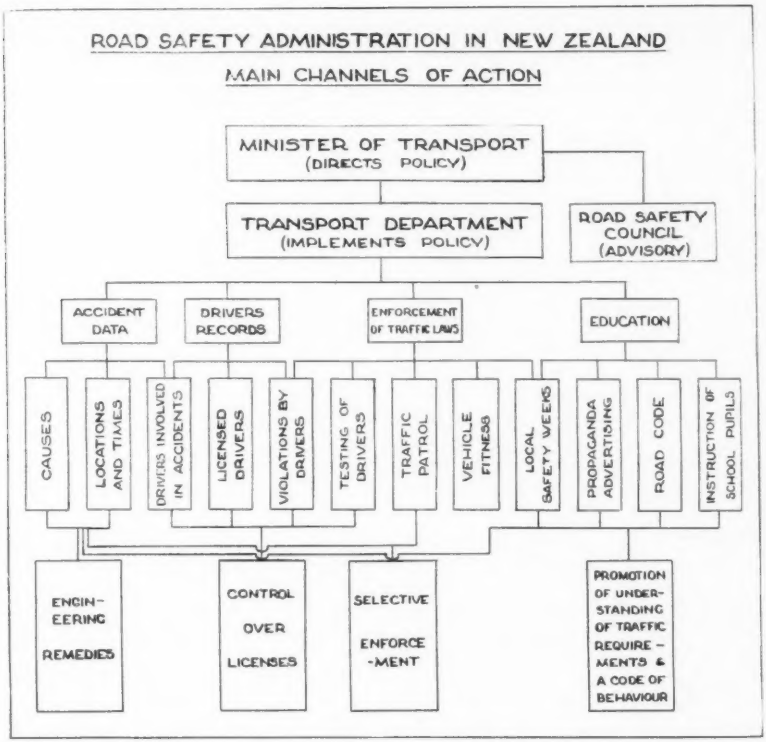
Uniform Laws

Administration of the traffic laws is in the hands of the Minister of Transport. One uniform set of laws applies throughout the whole Dominion. Any special local by-laws relating to traffic first have to be approved by the Minister.

The control of traffic is vested in the Transport Department of the general Government and in the larger municipalities. The Transport Department maintains a force of 100 traffic officers and the local authorities can muster about 120 uniformed men. In the cities point duty and control of parking take up the time of many of the local men. There are mobile patrols in the cities, however, and all of the Government's traffic staff are mobile, their first duty being the prevention of traffic accidents.

This traffic control organization is quite a separate entity from the civil police. The latter are responsible for the maintenance of law and order, but have no special responsibilities in

Mr. Forsyth is traffic engineer, Transport Department, Head Office, Wellington, New Zealand.



the traffic field except in the case of an accident involving some personal injury. While a police constable has all the necessary powers to deal with a breach of the traffic laws he is not specially trained in the control of traffic nor would he normally be called upon to undertake such duties.

"Traffic" Officers

On the other hand the responsibilities of the traffic officers do not extend to fields of law enforcement unconnected with traffic. The officers are specially trained in all phases of traffic control. Their powers of arrest cover the reckless, negligent or intoxicated driver but do not extend beyond this.

The policy of traffic law enforcement laid down by the Government is one of training all users of the streets and highways to the proper use of these facilities and urging care and courtesy as the prime requirement. The traffic officers are expected to set an example in their own strict observance of the rules of the road, in their courteous manner of driving and in their approach to the general public using the roads. It is not desired to drag every traffic offender before the courts. An officer who is officious or shows a "prosecution complex" is of no use to the Department. On an average the traffic officer cautions perhaps ten persons who are making some error on the road before he issues a ticket. Less than half the tickets issued result in prosecution of the offender in the

courts. However, no latitude is given to the speed merchant, reckless driver, or to the "drunk-in-charge".

Records Kept

At headquarters a register is maintained of all licensed drivers—some 400,000. Personal injury accidents and a record of traffic violations are entered on these cards. The driver who is "ticketed" as the result of some traffic offense, but whose case indicates an error of judgment, or forgetfulness or minor carelessness, is not prosecuted. Instead he receives a suitably worded letter pointing out that such errors are productive of accidents and asking his future cooperation. However, his offense is recorded on his card and it is found to be the exception that this driver offends again. On the other hand, when a driver begins to acquire a history of accidents or violations or both, his driving history is examined by a skilled traffic officer and if considered necessary he is put through searching tests to determine whether he should retain his license.

All applicants for a license must qualify in their knowledge of traffic laws, and must pass an eye-sight test and a test in handling a motor vehicle. All testing officers are appointed by the Minister of Transport and the majority of the tests are carried out by the traffic officers. Drivers who have reached the age of seventy years are required to undergo a driving test annually, and at the same time submit a satisfactory medical certificate.

Vehicle Fitness

All motor-vehicles must carry warrants of fitness which are renewable at six-month intervals. Warrants are issued by Government inspectors, by municipal authorities, or by private garages which are properly equipped and approved for the purpose by the Minister of Transport.

The whole traffic safety set-up is brought together in New Zealand under the one department. Thus all accident data, which form the basis for all preventive action taken, are handled in the Transport Department by staff attached to the traffic engineer. Accident maps are prepared and propaganda and enforcement are quickly directed to meet trends in regard to types of accidents, bad accident localities, predominating causes, and hours of occurrence. Here also the accident repeater is identified and his case handed over to the driver investigator. The traffic engineer maintains a guiding influence upon the education and enforcement policies and activities.

Educational Factors

The work of the traffic officer in the traffic education of the individual road user is supported by the usual forms of propaganda through the various advertising media. All such matter is designed to be informative and eschews the emotional appeal.

To instruct and train the future road user while still a child, a number of traffic inspectors with aptitude for dealing with children, have been trained as instructors. These men pay regular visits to the schools and give talks on traffic supplemented by appropriate films. They also patrol the roads in school vicinities and in places where children congregate.

While there is little that is spectacular in this policy of accident prevention which deals primarily with the human factor, it has paid dividends in a steadily reducing road toll during the past ten years. That a great deal more can be attempted and achieved is undeniable.

STUDY BEING COMPLETED

After a year's intensive work, led by J. P. Buckley, engineer-director, the engineering analysis of Michigan's highway needs is now nearing completion.

Speed Zoning in Kansas

by BRYAN WILSON, *Assoc. Mem., ITE*

PHILOSOPHERS have argued that speed, *per se*, is not destructive. The earth, they point out, has moved along for several millions of years at a speed exceeding 66,000 miles per hour without denting a fender, so to speak, in its annual trip around the sun. In the field of Astronomy, such speed is a snail's pace compared with that of some of the more stream-lined jobs. It must be remembered, however, that this elliptical path travelled by the earth is in the nature of a highly advanced freeway, with no cross traffic and no other vehicle on the road. Then, too, the driver is both omnipotent and omniscient!

The Kansas statute referring to speed on highways is rather indeterminate. The gist of it is that: "No person shall drive a vehicle on a highway at a speed greater than is reasonable and prudent under the conditions then existing." This leaves the matter of the judgment of *existing conditions* and the speed selected for driving under these conditions entirely up to a driver who may or may not be capable of sound judgment. Under this set-up there is also a frequent conflict of judgments; i.e., the driver and the State highway patrol trooper.

List Speed Limits

Determinate speeds as fixed by Kansas law are: 30 miles per hour in residential sections and 20 miles per hour in business sections of a city; outside the city limits, trucks of more than 5000 pounds gross weight, not over 40 miles per hour; trucks under 5000 pounds gross weight not over 55 miles per hour; school buses, not over 35 miles per hour.

Mr. Wilson is Ass't. Safety Engineer of the State Highway Commission of Kansas.

During the ten years that have elapsed since Kansas passed the Uniform Traffic Act, we have established about fifty speed zones. Ninety per cent of these restricted zones are adjacent to the larger cities in the state. We call this latter type "city approach" zones. The physical conditions warranting such a zone are usually due to a decentralization process that is going on in most of the larger towns of Kansas. As the town grows and becomes crowded filling stations, skating rinks, night clubs, chain stores, cafes and factories move outside the city limits where more space may be had for private parking. This movement is usually along a continuation of the principal streets of the city, which, in turn, are usually connecting links in the State highway system. When the growth along the highway outside the city limits becomes so congested as to approximate a business street within the city, we begin to have accidents. Our data show that most of them are due to unrestricted speeds and the frequency of turning movements around places of business and entertainment. Soon a petition from local residents is received advising us to do something about "these cars that go through here at eighty miles per hour."

"Eighty" Is High

We don't pretend to know why the figure eighty is so popular a numeral, but we suspect that it is because it is a disquieting speed and may cause us to prick up our ears. Of course, a speed check at this locality shows that the figure eighty is a gross exaggeration. However, some cars are checked doing between sixty and seventy miles

per hour. This, we feel, is too great a speed for existing conditions, so we prepare a topographical map on a tracing, carefully showing all buildings and entrances for the congested distance, make blue prints and submit them with a speed zone resolution to the State Highway Commission. If the gentlemen who compose this Commission see eye to eye with us, a speed zone results.

Our authority to designate such zones is derived from the Speed Restriction law which states that "whenever the Highway Commission shall determine upon the basis of an engineering and traffic investigation that any *prima facie* speed here-in-before set forth is greater than is reasonable or safe under the conditions found to exist at any intersection or other place or upon any part of a highway, said Commission shall determine and declare a reasonable and safe *prima facie* speed limit there-at which shall be effective when appropriate signs giving notice thereof are erected at such intersection or other place or part of the highway."

Set Limit at 35

It is customary for us to set up a zone of thirty-five miles an hour in a City Approach zone since travel is along what approximates a city street. Then, too, at least half of the travel is towards a city limit where a thirty mile per hour sign will confront the drivers. We, therefore, feel that this is a transitions speed. Such a zone removes the necessity of judgment on the part of the drivers and is also a great aid to the highway patrol in enforcement.

Other rural speed zones protect entrances to large plants, or take in a section of highway which, due to faulty alignment, narrow bridges, etc., has a high accident frequency.

Accidents Reduced

We do not make a practice of zoning a length of highway under one-half mile, as the highway patrol takes a dim view of shorter zones. Due to a lack of a sufficiently strong highway patrol for the almost 10,000 miles of state and federal highways in Kansas, enforcement of these zones is very poor. Sheriffs in our one hundred five counties cannot be depended upon for traffic enforcement. There is a general feeling among them that this sort of thing is up to the highway patrol. Yet, strange to say, in spite of lack of enforcement and the fact that a large proportion of drivers violate the stated speed by from ten to twenty-five miles per hour, our records show that there have always been accident reductions in these zones. Perhaps the very fact that the driver knows he is violating the regulation makes him more alert to conditions.

Vehicle Considered

Aside from City Approach zones, we really have to be shown the necessity of a zone on rural highways. We realize, and the Commission realizes that the dominant idea of man throughout the ages has been to transport both himself and his merchandise from one place to another in the quickest possible time. We know that each year motor companies build better and speedier cars and that newer and better designed highways are being built with a greater number of safety features.

We also take into consideration the economic aspects of speed restrictions. When the question of zoning a certain section of the highway is brought to the attention of highway officials through a sequence of accidents determined to be the result of a speed not reasonable or prudent under conditions then existing, the officials do not act hastily. It is realized that this is a modern age and that time is money. Every employed person is paid for his time. The efficient person is the one who accomplishes most in the time

for which he is paid. Everyone is trying to save time. Realizing this, the Kansas Highway Commission wishes to be very sure that a limitation of speed upon a highway is necessary before taking an action that will result in loss of time, this loss being a function of the length of the limited section, the stated speed for safety, and the number of motor vehicles using that particular highway.

Example Given

Let us take for a problem in speed zoning a section of highway two miles in length. Our presumption will be that time is money. We will assume that 3000 vehicles per twenty-four hours use this highway, and that the average speed is fifty miles per hour. Assume that a thirty-five mile per hour zone has been requested.

Before zoning, this two mile section has been traveled at fifty miles per hour, which means that the two miles has been traversed in 2.4 minutes. After the thirty-five mile per hour zoning, the time required to traverse it will amount to 3.43 minutes. This means a loss of time to each car of 1.03 minutes. 3000 x 1.03 equals 3090 minutes, or 51.5 hours per day to the driving public. This amounts to 18,797 hours, or 783 days per year. If it is assumed that the pay of the average driver is $6.00 per day, the monetary loss annually is $4698.00.

Naturally, no highway official likes to think that he is causing a loss of this magnitude annually to the public unless he is certain that by virtue of the reduced speed lives will be saved. On these lives it is impossible to agree on a monetary value, as such a value would depend on whether or not it was your wife or your child that was killed.

On rural zones we use the 85 percentile method. We take a spot check of the speed of five hundred cars bearing a local license. The speed at which 85 per cent of these local vehicles travel is determined. Then, on the assumption that if these 85 per cent, knowing the alignment, sight distances, roadside development, etc., travel at a certain speed this speed must be near a reasonable one, we accept it as a basis for our zone. Next, we interview local people who use the road, local sheriffs and peace officers, and the local highway patrol troopers. If all seem to agree rather closely, then our speed is accepted as the probable speed reasonable and prudent under the conditions then existing.

We also have ideas about the signing of such speed zones. For instance, peace officers tell us that even the most respected citizen who violates a traffic regulation or ordinance objects to feeling that he has been ambushed, or trapped. To prevent that feeling and to give fair warning to all, we place a slow-type standard sign about four hundred feet from each end of the zone. This sign bears the legend: "Speed Zone Ahead". At each end of the zone we place a sign bearing the legend: "Resume Speed—Thank You". We feel that the small extra cost of the "Thank You" is repaid by taking some of the bitterness of restriction from the mouth of the driver.

We also like to have the speed limit signs not over an eighth of a mile apart, so that one of the signs is always visible ahead. This prevents the old alibi on the part of the violator: "I saw the speed limit sign and slowed down, but as I didn't see any other sign I thought I was through the zone."

Our records show that speed zoning is important in accident prevention providing it is not overdone. Restrictions are disliked by all of us, and are justifiable only if it is satisfactorily proven that they are necessary.

Merits of Polarization

by LeVerne Johnson, *Managing Editor*

Dr. Edwin H. Land, president of the Polaroid Corporation, believes the polaroid headlight system is now ready technically and suitable for mass production.

"We believe," he says, "that the most suitable method of introducing the system is to build equipment into all new cars beginning on a certain date to be decided."

J. H. Hunt, reporting for the Engineering Liaison Committee of the Automobile Manufacturers Association, said that the committee "has recommended against the adoption of polarized headlighting at this time."

Dr. Land and Mr. Hunt, along with Val J. Roper of the General Electric Company, presented at the 1947 meeting of the Highway Research Board some enlightening and interesting information on the whole question of the use of polarization for the elimination of headlight glare.

Reduces Glare

Using beam control of unpolarized light it is possible only to reduce glare, not to eliminate it, Dr. Land reported. With cars 400 feet apart, and with nearly ideal conditions of level road and properly aimed lower beam, an oncoming driver receives some 900 beam-candle power in his eyes. Moreover, Dr. Land says, "With an angular elevation of three degrees and a curve in the road, you may be confronted with 20,000 beam candle power from the *lower* beam of the sealed beam system. With an angular elevation of only one degree in the road, the *upper* beam throws the glare of 40,000 beam candle power into your eyes."

The performance of the polaroid system, Dr. Land believes, " . . . is as if you were always driving with a light equal to the *upper* beam of your present sealed beam lights, and as if the approaching car were getting along with the *lower* beams of his sealed beam lamps cut, furthermore, to about one-seventh of their present brightness."

Dr. Land points out that the polaroid system not only successfully eliminates glare, but it eliminates the blind driving zone to the right of an approaching pair of headlights. It is not possible, he claims, to eliminate this zone with present headlights, for in upper-beam meetings drivers are blinded and in lower-beam meetings there is inadequate illumination plus some glare.

During the transition period between the present system of head lighting and the full use of polaroid even "misuse of polarized headlights (is) no more hazardous than misuse of sealed beam now."

Considers Cost

As to cost, Dr. Land reports that "the polaroid system does not appear to be out of line if you compare it with the cost of a number of popular automotive accessories: it may be somewhat more than an outside sun visor, about the same as a good heater, perhaps as much as a good radio." Moreover, mass production can be expected to reduce the cost.

On the matter of length of the transition period, Dr. Land claims ". . . the system can be working at a high degree of effectiveness in possibly five, certainly in less than eight years after it is introduced."

In his remarks discussing reasons why the industry turned down the adoption of polarized headlighting at

this time, Mr. Hunt outlined many of the tests conducted under the auspices of the Engineering Liaison Committee working in cooperation with the Polaroid Corporation, the General Electric Company Lamp Division, and the engineers of the automotive electrical equipment manufacturers.

Loss of Light

"Polarizing the light," says Mr. Hunt, "by passing it through the sheet as fixed to the headlamps *causes the loss of about* 60% of the light under the best conditions. *The viewer absorbs about* 25% of the light polarized in the same plane as the viewer. Therefore if a driver behind a viewer having the same plane of polarization as the headlamps is to see an object as well with polarized light as he could with ordinary light with a viewer *over three times as much light must be provided before polarizing it*. Since dark colored objects do not depolarize very much, a little over a three times increase in lamp watts is required for equal safety. To insist on *equal seeing of light colored objects with polarized light would demand over six times as much wattage at the lamp* since the light colored objects depolarize nearly all of the polarized light striking them, and the viewer absorbs over 60% of the depolarized light reaching it."

More Wattage Needed

Lamp wattage needed for polaroid lamps is 125, as compared with 45 for present sealed beam equipment, Mr. Hunt reported. The end result will necessitate the use of a generator with approximately double the capacity of present equipment. New generators would have to be heavier and would obviously require more power to operate. Heavier wiring would be necessary, says Mr. Hunt, and possibly a larger battery. "The overall result," he contends, "is a considerable increase in weight and cost, in fact a very large part of the total cost increase is in this part of the equipment."

"The cost," Mr. Hunt reported, "on the basis of cost of last summer . . . varied from $30.00 to $80.00 per car. On sales in a normal year this increase in unit price would represent a cost to the public of $100,000,000 or more."

In discussing a number of possible plans for introducing the polaroid system, Mr. Hunt pointed out that it would be necessary to enact new legislation and to modify enforcement procedures to deal with the mixed use of the two lighting systems during the transition period. Also, legislation in some states limiting beam candle power to 75,000 must be modified. Polaroid lamp output may run up to 100,000 beam candle power.

The addition of a pair of city driving lights—a total of four headlights across the front of the car—is another item Mr. Hunt pointed out. These are necessary in order not to blind pedestrians while driving in cities, for

More than 850 top engineers, research men and leaders from both public officialdom and industry considered 120 reports and papers presented through 24 committees at the 27th annual meeting of Highway Research Board in December.

The scope of the program and attendance gave evidence that highway transportation leaders are acutely aware of their vast responsibilities both in construction and traffic safety. Emphasizing highway planning and traffic safety along with construction technology, the meeting was regarded generally as the most outstanding of its kind ever held.

pedestrians will not have polaroid viewers.

Not for Urban Use

On the subject of viewers, Mr. Hunt points out that an extra viewer for a second front-seat passenger is no problem, but goggles may be necessary for rear seat passengers. Viewers could not be used in city driving at night since they absorb 60 per cent of the light provided by street lighting.

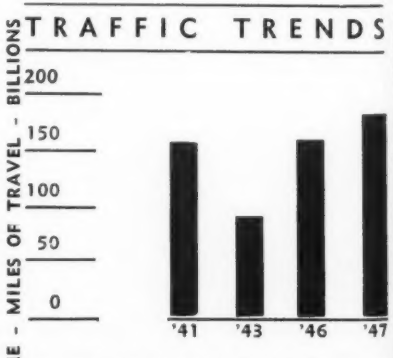
In addition to stopping direct beams from opposing polarized lights, the viewer also stops light reflected without depolarization from the roadway or atmospheric particles.

"Therefore," Mr. Hunt says, "atmospheric glow from lamps about a curve, or over a hilltop becomes invisible to a driver behind a viewer." This places even greater importance than ever on staying on the right side of the roadway when approaching hilltops and curves. It also adds to the danger while in the left lane during a passing maneuver, because the atmospheric glow of an approaching car is not present. Mr. Hunt also said that where one car is following another, the headlights of the second car may be masked by the first car since the headlights of the second car can be detected only by direct sight.

Mr. Hunt pointed out the possibility of bad public reaction to polaroid lighting when drivers of new cars with the polaroid system realize that they have no effective protection from sealed beam uppers. New "polaroid drivers" may feel that they have paid for something which protects the other driver, if he installs a viewer, but until the number of polaroid users is substantially great they have increased their own protection little.

One of Mr. Hunt's closing paragraphs was: "Based on experience to date, our Committee is not convinced that the benefits during a considerable period after complete conversion to polarized lighting will overbalance the troubles which it feels certain will develop in the long transition period. Therefore, the Committee believes that it is not in the public interest to introduce polarized lighting at this time."

F. V. Regal, Engineer of Materials, Missouri State Highway Department was elected chairman of the Highway Research Board, and R. A. Moyer, Research Associate Professor of Highway Engineering, Iowa State College, Vice-Chairman. Pyke Johnson, Automotive Safety Foundation, President, was re-elected to the Executive Committee.



TRAVEL ON RURAL ROADS FOR FIRST ELEVEN MONTHS OF 1941, 1943, 1946 AND 1947.

[Based on Public Roads Administration Data]

Protecting the Pedestrian

by ERNEST H. MILLER, *Junior Mem., ITE*

A comprehensive pedestrian program was started in South Bend in August of 1940, after a detailed survey of pedestrian problems and analysis of pedestrian accidents was presented to the City Traffic Commission* in the form of a report by the City Traffic Engineer. This report was titled "The Pedestrian—South Bend's Number One Problem in Traffic Safety".

This report covered analysis of pedestrian fatalities over a period of six years, and analysis of other pedestrian-motor vehicle accidents over a two-year period. The report revealed that the pedestrian was the most frequent victim of motor-vehicle accidents in South Bend. During the period 1934 to 1939, 53 per cent of all persons killed and 48 per cent of all persons injured in traffic accidents were pedestrians.

Comprehensive Report

The survey and report revealed who these men and women, boys and girls were that were killed and injured in South Bend. It revealed also where, when and most important of all why these accidents happened.

The Traffic Commission took immediate action and appointed various committees within the Commission to cope with the problem and an organized Engineering, Education and Enforcement program was outlined and put into operation.

South Bend did not do anything out of the ordinary in the way of pedestrian safety activity. However, the pedestrian safety program was and still is based on facts and is continuous. The fact that the pedestrian program is not spasmodic is the main reason for its success.

Press is Helpful

Among the many activities carried out during our pedestrian safety program, the following are worthy of special mention. It is probable that no other newspaper in the country has devoted so much space to traffic safety as the South Bend Tribune, and certainly no other daily puts safety on the front page to the same extent. To give you some idea of the cooperation received from the Tribune, a total of 37 full newspaper pages on traffic safety, a large share of which was devoted to the pedestrian, was published in the 12 months following the inauguration of the pedestrian program. These 37 full newspaper pages including 302 news articles, 113 features, 92 pictures and 119 editorials. WSBT, the Tribune broadcasting station, produced 28 hours of safety programs, and broadcast 1,250 spot announcements on safety during this same 12-month period. Other activities such as Boy Scouts in the central business area with posters informing motorists and pedestrians each others rights; sidewalk messages, concentrations of police officers in the area to warn motorists and pedestrians of unsafe practices, and issuing of warning tickets are but a few worthy of mention.

Results Obtained

Results of continued pedestrian safety activity in South Bend are somewhat reflected in the obedience to signal indications in the central business section. In 1940 just prior to the launching of the pedestrian program,

*The City Traffic Commission is a group of 21 men appointed by the Mayor to act in an advisory capacity on traffic safety matters. The membership is composed of city officials and civic leaders. Mr. Miller is City Traffic Engineer, South Bend, Indiana.

58.3 per cent of all pedestrians observed, crossed with the green light. In 1941, eight months after the pedestrian program was started, 79.2 per cent walked with the green light. In 1945, 94.8 per cent, and in 1946, just prior to the installation of pedestrian "Walk-wait" signals 98.5 per cent crossed with the green light.

The increase in pedestrian obedience to signals in 1941 over 1940 was brought about mainly through eight months of concentrated educational activity aimed particularly at the motorist. This included the stationing of police officers at the main intersections in the downtown district to insist that motorists turning right and left yield to pedestrians walking with the green light. This was done because analysis of pedestrian accidents showed that more pedestrians were struck walking with the green light than when walking against it, and that the majority of pedestrians were struck by turning vehicles.

Prior to 1940, motorists did not yield to pedestrians at all when making turns. That obviously discouraged pedestrians from walking with the green light because they were usually blocked by turning vehicles. By 1941, the majority of motorists were yielding to pedestrians and a substantial increase in pedestrian obedience (from 58.3 to 79.2 per cent) was recorded. Today motorists yield nearly 100 per cent.

Educational Program

In August 1942, after 24 months of educational activity, the first pedestrian arrest was made for walking against a red light. This was a test case and was the only pedestrian arrest made in 1942 for crossing against a red light. In 1943, 198 pedestrian arrests were made for crossing against a red light. In 1944, 169 arrests were made and in 1945 the number was 27.

Elimination of jaywalking or crossing between street intersections was also included in the pedestrian program and has shown similar results. For example, the worst mid-block crossing in the central area in 1940 showed 725 pedestrians per hour crossing mid-block across Michigan Street (U. S. 31) between Jefferson Boulevard and Wayne Street. Today the number is 13 per hour.

South Bend now has pedestrian walk-wait signals at 17 intersections in the central business area. One month after the installation of the signals and before any arrests were made, voluntary obedience to the signal indications was 93.4 per cent. Specifically 93.4 per cent crossed with the walk-green indication, 5.1 per cent with the wait-green indication and 1.5 per cent with the wait-red indication. The enforcement program started on the fifth week after installation of the pedestrian walk-wait signals and it is believed that soon there will be nearly 100 per cent obedience to these signals.

Not only has pedestrian obedience to signals greatly improved and jaywalking decreased, but the pedestrian accident experience over this same period of continuous pedestrian safety activity has also shown a decided improvement. Pedestrian fatalities in the City of South Bend from 1934 to 1939 inclusive numbered 61 out of a total of 114 traffic fatalities in the city. This is 53 per cent of the total. From 1940 to 1945 inclusive the number of pedestrian fatalities was 41 out of a total of 106 traffic fatalities in the city. This is only 39 per cent of the total. These figures, six years after as compared to six years before, are very encouraging and while the city is not satisfied with this achievement, it is evident that the efforts put forth in the pedestrian program were well worthwhile.

Traffic and Parking Predicament

by HENRY W. OSBORNE, *Member, ITE*

THE traffic problem is as universal as the gentle rain that falleth from heaven. The only difference is that there is nothing gentle about it. The problem is constantly pointed up by the pain and suffering and death of traffic accident victims and the economic loss that results from inefficient movement of traffic. And the increase in the number of motor vehicles which may reasonably be expected in the next few years emphasizes the necessity for careful planning now to solve the predicament of traffic and parking.

The aspects of the over-all problem are legion in variety, but they may be resolved into two general categories—those affecting the pedestrian, and those affecting the driver.

Needs Instruction

The mounting toll of pedestrians who are either killed or injured in traffic accidents is ample proof that someone must take care of the pedestrian until he learns to take care of himself. The solution will lie in educating him to walk safely and at the same time improve the physical facilities which affect his movement.

There is ample evidence also that the driver should come in for some attention. For example, many drivers have never had a re-examination although they have held licenses for as many as twenty-five or thirty years.

Last, but by no means least, is the parking enigma. The constant increase in motor vehicles serves but to accent a situation that was serious years ago. The situation has now reached the point where action must be substituted for theoretical discussion. Americans own cars and something must be done to provide space for them.

Lacks Appreciation

The unfortunate fact is that the average citizen, although vitally affected by traffic, is entirely lacking in appreciation of its seriousness. He usually thinks only of the actual movement that applies to him personally. The fact that thirty thousand or more persons die annually in traffic accidents is of little consequence to the average pedestrian or driver until someone he knows becomes a victim or he is directly involved in a fatal mishap.

Stress Illumination

The unwarranted high night-time accident toll places upon those of us in responsible positions the onus for selling the need for improved street illumination and seeing that theories are resolved into actual accomplishments.

We know that present highway facilities with cross street interference, antiquated traffic signals, stop signs, bad pedestrian habits and a myriad of marginal factors need prompt attention. But the average citizen does not know this, and must be informed so that we shall encounter less resistance and more sympathetic cooperation in the vital matter of safety on the highways.

We are all aware of the need for better control and utilization of parking at available curb spaces, and of the need for vastly increased off-street parking areas. Long ago we discovered the crying need for better utilization of present highway capacities by more frequent use of one way streets, turning prohibitions, pedestrian control and greater use of mass transportation facilities.

Signals Antiquated

Not one of us has any excuse for not knowing that antiquated traffic control signal systems must receive prompt attention.

It is a matter of record that driver limitations increase with age. The elderly motorist is less agile. His reactions are slower. His vision is not as good as it was. His mind often is preoccupied with other thoughts than those of the moment. What are we going to do about the problem of old age cars? Before the war the average age of the motor vehicle was seven years. Now it is eleven. Deterioration of outworn equipment merely adds to the dilemma.

Some Solutions

There is one very logical starting point in the program to take care of our traffic. That is in the matter of enforcing traffic laws. Support the police and courts by encouraging their best efforts. Both will do a good job if the public cooperates. This is the first line of attack in making any community safe for vehicular and pedestrian movements. Adequate laws are on the books. Police departments are functioning. Courts are in operation. There is no excuse for delay in this respect.

An adequate public education program must be undertaken, using every known medium. The task of keeping the public informed of accident experiences, traffic legislation, enforcement activities and engineering improvements is a continuing one in which there must never be any letdown. The newspaper, radio and the billboard must be used without surcease so that the pedestrian and the driver are never allowed to forget that traffic is their problem. In Buffalo a major portion of the credit for our success in improving our accident picture may be traced directly to the magnanimous cooperation freely offered by the radio and press.

Instruction in Schools

There is likely to be little argument against the proposition that driver training should begin early. Amherst Central High School has a driver training course that may well be the envy of every other high school in New York State. The same thing may and should be carried out in every secondary school. The automobile industry and its dealers stand ready to cooperate. Buffalo will have its first such course this summer in Bennett High School. We should see that schools in our communities follow suit.

Because it is not apt to meet with the immediate approval of the average motorist, it will be necessary to do an exceptional selling job in establishing the need for driver re-examination and re-education. Many motorists have their licenses renewed time after time by no more inconvenient a procedure than filling out a form and paying the nominal fee. The result is that many are entirely ignorant of new traffic control legislation. They are unaware, for example, that they are required to come to a complete stop when approaching a standing school bus from either direction. They blithely ignore red signals at intersections protected by leading greens, because from force of habit they take their cue from approaching cars and not their side of the signal. The green arrow beneath many traffic signals is an invitation to make a quick right turn without stopping as required by law. In Buffalo last year a survey showed that 20 per cent of the drivers were guilty of this infraction.

Re-examinations Suggested

Driver re-examination every five years would be spaced sufficiently far apart to preclude the charge of constant inconvenience. Yet it would

enable the state to determine the physical ability of each operator to drive, and at the same time would offer an opportunity to acquaint him with new traffic legislation and techniques.

There is equal need for a continuing program of motor vehicle inspection. The suggestion that this be carried out in automobile service stations appears to me to offer the least satisfactory solution. The human element is too great to insure efficient operation. It would be far better if this program were an official state function which could be carried on at permanent inspection stations in the densely populated areas, and probably by mobile units among smaller communities.

There is one major solution to the hazard of night-time accidents. That is proper street and highway lighting. Many cities in the State of New Jersey have proved conclusively that lighting in accordance with the Illuminating Engineering Society's code reduced and, in some cases, altogether eliminated accidents. The success here in Buffalo of two demonstration lighting areas lends further credence to the theory that accidents happen infrequently on well-illuminated streets. It is no idle anticipation that when Buffalo's street lighting program is carried out in its entirety the annual night-time fatal accident toll may very well be reduced.

"Peck's Bad Boy"

The pedestrian is the Peck's Bad Boy of modern traffic. While the motorist has been regulated, taxed and restricted, the pedestrian has gone his merry, jay-walking way, exposing himself to almost constant danger and adding materially to the woes of the driver. There is a crying need for enactment of legislation to control and protect the pedestrian. It will be no small task, but by no means impossible, to convince the pedestrian that it will be better for him to arrive at his destination a minute or two later, but with the consciousness that his movement is protected, rather than getting there quicker but in the constant shadow of possible injury or death.

It would be Utopian if we were able to make our highways wide enough to care for present and future vehicular loads. But since this in most cases is utterly impossible, we must seek recourse in the better use of the highways that we now have. This will consist of a practical program providing for, among other things, increased no-standing areas, one-way streets, turning prohibitions and improved traffic control systems.

The facilitation of traffic movement across states has been a matter of concern for many years. We are about to see the fruition of careful planning in proposed throughways and arterial highways. There are some urban conditions that also will require major physical improvements.

Staggered Hours

In exceptionally bad situations it may be necessary to revert to the system of staggered opening and closing hours which proved so effective during the war. This spaces out peak hour demands for mass transportation services and levels off traffic volumes on public highways.

The parking predicament is offering a universal headache to the cities of America. It is particularly pressing in New York State and other areas which are subject to long periods of ice and snow.

Winter relief is available in parking curfews which keep vehicles off streets during plowing periods. In Buffalo parking is prohibited on mass transportation routes from midnight to 7:00 A.M. from October 1st to April 1st. A similar prohibition remains in

force throughout the balance of the year with the exception that the period is 2:30 to 7:00 A. M.

Emergency Laws

It is essential that every city have emergency legislation which would prohibit all parking on one side of all primary thoroughfares during times of heavy snow. And it is a matter of common sense that we must all look forward to the day in the near future when there will be permanent no-parking regulations for all streets, business, main traffic or residential, if they are thirty feet or less in width.

Elimination of curb parking and the increase in vehicular registrations are forcing public recognition of the desperate need for vastly increased off-street parking facilities. The International Association of City Managers' survey of municipal off-street parking facilities, which was printed in the April, 1946, issue of Public Management, had this to say:

"By the end of 1946, a total of 345 cities, or 40 per cent of the 875 cities reporting information for the 1947 Municipal Year Book, had one or more municipal off-street parking lots in operation, representing an increase of 63 per cent over 1942 when only 211 cities had city-owned parking lots. Sixty-five cities over 10,000 population established one or more lots for use by the general public during 1946."

Parking Studies

The New York State Department of Public Works on March 12, 1946, compiled data for the Buffalo Urban Area Report. The statistics were taken in the twelve hour period from 7:00 A.M. to 7:00 P.M. The report showed that in the downtown area 40,379 vehicles used some type of parking. The majority, 16,056, parked at the curb, while an almost equal number, 15,971, used parking lots. Approximately 5,000 parked in garages while data on the remaining 3,352 were not available. The report showed that the peak accumulation occurred between 2:00 and 3:00 P.M. when 10,350 vehicles were parked. A survey taken in approximately the same area in 1932 showed approximately 50 per cent less parked vehicles. Expectancy for the future is that by 1960 we shall need space for 14,300 vehicles.

Since 1937 the Board of Safety has eliminated many blocks of curb parking in the area and four key parking areas have been sold for building purposes. The combination of the two have eliminated at least 1,000 curb and off-street parking stalls in the past two years. Very few buildings have been torn down during or since the war because of the demand for any kind, size or shape of a building. Today's building costs are not helping the situation.

Cite Parking Demands

Thus the situation has just about reached the critical period. Charles H. Sells, Superintendent of the New York State Department of Public Works, illustrated in the Buffalo Urban Area Report "that by 1960, 60 three-story buildings, with assumed 100′ x 100′ floor space, will be needed to handle 8,000 car parking demands." Mr. Sells assumes that all land will be too valuable for ground parking, present garages will be maintained and curb parking to be permitted. The Board of Safety parking elimination program thus boosts the 8,000 car demand.

This problem is being studied and will be met.

Some Western New York municipalities and private organizations are making progress with the parking problem. For example, in the Bailey-Kensington section of Buffalo, the Businessmen's Association evolved a unique program to care for what is a residential shopping area.

As a result of a study by the Park-

ing Lot Committee of this Association, the Bailey-Kensington Parking Corporation was founded with a capitalization of $105,000. The money was solicited from interested merchants and property owners in the area.

The plan called for five customer lots, approximate capacity of 400 cars, and three employee or reserve capacity lots with 154 stalls. To date, part of three of the customers' lots are in operation.

In July, 1946, the Lockport Merchants Association submitted a report entitled "Planned Off-street Parking Facilities" to the Lockport City Council. Their plan called for three facilities with a total capacity of 345 units, total area of 93,220 sq. ft. costing $107,600. This estimated cost included $75,300 for land minus resale of buildings and $32,300 for improvements. One site required a rather expensive retaining wall installation.

The merchants submitted records that showed between May, 1942, and July, 1946, that 337 meters produced $105,851 and then urged that this money be spent for police enforcement, traffic safety and parking facilities.

At this date, there has been little progress made on the parking plan but the Council has gone on record to appropriate parking meter revenues for traffic control improvements which include off-street terminal facilities.

In June, 1946, President George A. Bury, George V. Allen and other members of the Board of Direction and Parking Study Committee of suburban Kenmore, really went to work to study and bring out a plan to keep their business in the black and keep Kenmore on the map as a desirable shopping center.

Briefly, the plan calls for three parking lots with a per day capacity of 1200 cars, costing $52,000 for land and improvement.

Other parts of the plan calls for parking meters, modernization of street lighting and other items for the business area. The parking meter revenues are to be earmarked to cover the cost of the off-street parking part of the plan.

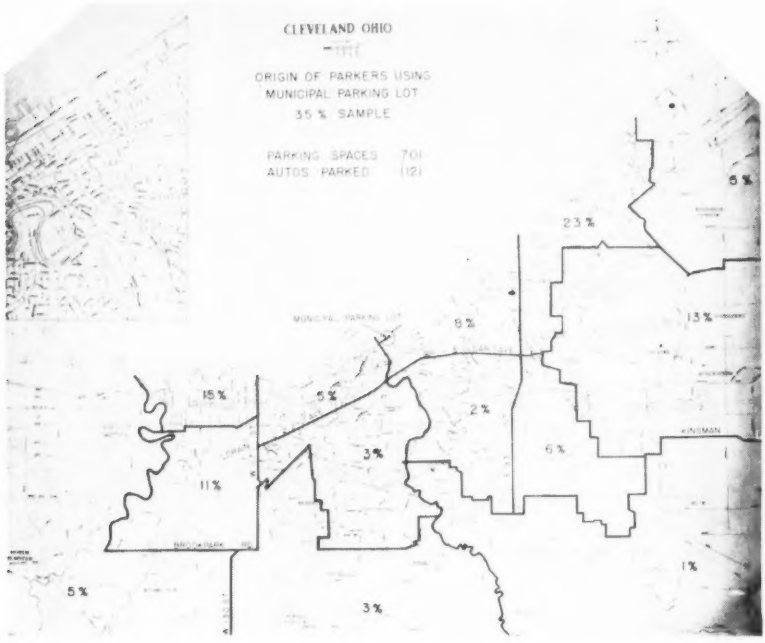
The dual problem of traffic and parking is self-evident. Statistics serve but to accent a situation of which we are all fully cognizant. We cannot seek excuse for failure to preserve the safety of our communities by saying we don't know what to do. The fact of the matter is that we know where the solution lies, but the time has come when idle discussion must be supplanted by immediate action. Municipalities and private business organizations must realize that the successful solution of both vehicular movement and parking is going to require substantial investments. In the final analysis these investments will pay off a thousand-fold in easier access to business and industrial areas, and in the marked reduction of all types of accidents. And who dare put a price on the value of suffering prevented and lives saved.

Mr. Osborne is Traffic Advisor, Board of Safety, Buffalo, N. Y. This article was adapted from a speech presented at the 38th Annual New York State Conference of Mayors.

When Mason Nurick's auto was stolen in Hollywood, he borrowed a neighbor's to drive to the police station and report the loss. En route home, his borrowed car was smacked from behind. Mr. Nurick got out to check up on the damage, recognized the car which had hit him as his own, held the driver for police.

OD STUDY SHOWS VALUE OF CLEVELAND PARKING LOT

by V. L. JOHNSON, *Member, ITE*

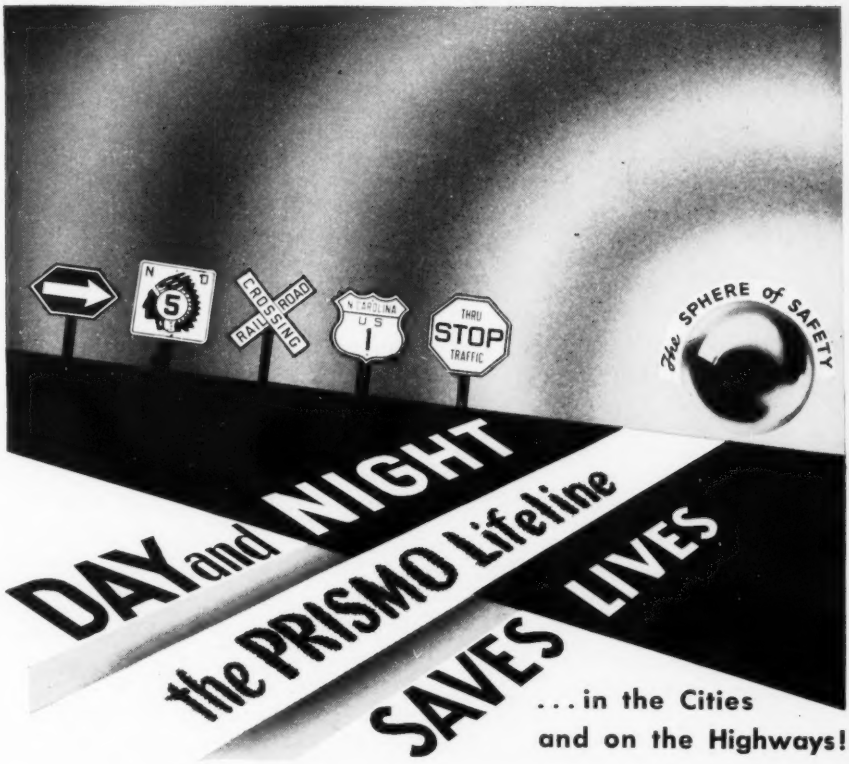


Shown above and on page 174 are maps illustrating the origin and destination of persons using the Municipal Free Parking Lot put in operation March 16, 1946. The percentages and totals shown are those of a survey made in April 1946 at which time the two lots south of the shoreway west of E. 9th Street, the large stadium lot and the lot on the west side of E. 9th Street just north of the Shoreway were in use.

Periodic observations made since that time indicate that the ratios and percentages have not appreciably changed and could be applied to the present parking lots consisting of the two original lots south of the Shoreway west of E. 9th Street and the new lot south of the Shoreway east of E. 9th Street which is interconnected with the original lots by a roadway under E. 9th Street providing all right hand turn bus loop service and interchange between the lots. Applying the survey figures and ratios to present average day use the conditions would be: spaces—800, autos parked—1280, persons accommodated—1920.

As expected most of the Municipal Lot patronage (80%) is by residents near the major feeder streets connected to the Shoreway. These feeder streets are Lake, Clifton, Detroit and Madison to the west; Berea, Triskett, Lorain and West Boulevard to the southwest; Lakeshore, Saint Clair and Superior to the northeast; and Cedar, Fair-

Mr. Johnson is City Traffic Engineer, Dept. of Public Safety, Cleveland, Ohio.



THE PRISMO LIFE-LINE ON PHILADELPHIA'S BENJAMIN FRANKLIN PARKWAY

Note how clearly it stands out, even from high heights and far distances.

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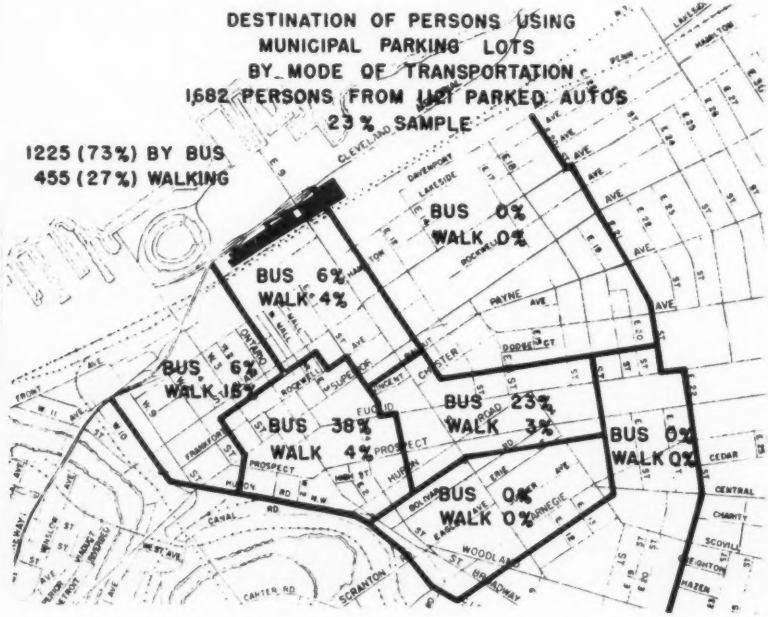
mount, Shaker and Moreland to the east coming into the Shoreway by way of the Liberty Row northwest diagonal parkway near E. 105th Street.

Destination of all persons accommodated was to the areas immediately served by the bus loop. Distances for those who walked to their destination were greater than expected: 58% walked an average distance of 1650 feet, 16%—2915 feet, 15%—2100 feet and 11%—3096 feet. The larger destination percentages were to the Department Store and Office Building sections in the Central Business District. Most of the patrons were longer time parkers.

The low percentages of origination from the southeast and southwest areas indicate a need for similar off-street parking facilities on the southerly side of the Central Business District—facilities for the east areas now being provided by the privately operated Bus Loop service lots at Euclid Avenue E. 21—E. 24th Streets. The City Administration is now attempting to provide these facilities.

We feel that the low cost-low fee bus service parking lots just outside of the Central Business District are a definite advantage to the City. They permit access to the District without requiring individual passenger carrying vehicles to use the overloaded street system. They reduce congestion on the streets by eliminating the cruising resulting from trying to find the curb, lot or garage space nearest to the destination and reduce the need for the City providing additional street space at tremendously high costs. Obviously they reduce accident possibilities.

In order to help pay for operation and maintenance of the present lots we recommended that a parking fee be charged possibly as low as 5 cents per



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day. This fee could best be collected by installing parking meters which have been removed from city streets. The income would run about $50.00 per day which would cover guard and meter costs, leaving some balance for maintenance of the lot surfaces. No action has been taken on the parking fee.

NEW DEVELOPMENTS IN TRAFFIC ENGINEERING

by CHARLES S. LECRAW, JR.
Associate Editor

Heated Streets

Thanks to the ingenuity of G. S. Paxson, Bridge Engineer of the Oregon State Highway Commission, snow and ice will be no problem on an 8 per cent grade on a 4-lane highway entering Klamath Falls. The grade was necessitated by the distance—only 320 feet—between a canal over which the highway must pass and a railroad, under which the highway was routed. Mr. Paxson decided to eliminate snow and ice problems by taking advantage of natural hot water, with temperatures up to 220 degrees, which is available from wells in Klamath Falls. A 10-inch well was drilled and a 2-inch pipe was run to the pavement area. The pavement slab will contain ¾-inch pipe in 60 foot panels. These pipes and the 2-inch pipe will constitute a closed circuit containing water in a solution of anti-freeze. Thermostatically controlled pumps set the water in motion when the temperature reaches the freezing point. The water is heated by pumping through a portion of the 2-inch pipe extending close to the bottom of the 250-foot well. Another pump will exhaust hot water from the well, in order to prevent cooling of the well by constant circulation of cool water through the closed circuit. Full details may be obtained from "Pacific Builder and Engineer" magazine of October, 1947.

Answers to Quiz

1. 3	11. 2	21. 1	31. 5	41. 7
2. 4	12. 3	22. 2	32. 3	42. 11
3. 2	13. 4	23. 3	33. 4	43. 10
4. 5	14. 3	24. 4	34. 2	44. 9
5. 4	15. 3	25. 3	35. 4	45. 9
6. 4	16. 5	26. 2	36. 5	46. 8
7. 5	17. 1	27. 5	37. 5	47. 5
8. 5	18. 5	28. 4	38. 5	48. 10
9. 1	19. 4	29. 3	39. 5	49. 2
10. 4	20. 5	30. 1	40. 1	50. 11

STRESS MAGNITUDE OF HIGHWAY PLANNING

"No long-range planning project can be carried to successful conclusion unless adequate investigations are made of the economic and social, engineering, financial, and administrative aspects of the highway problem," C. A. Steele, Public Roads Administration, reported at the Highway Research Board's 27th annual meeting in December.

"It is evident," he said, "also that no satisfactory long-range highway plan can be developed for any state without due consideration being given to the road network as a whole; to the proper methods of financing highway construction, maintenance and administration on all systems and by all governmental units involved; and to the financial requirements of all aspects of governmental operations."

"Planning must take into account," said the speaker, "the expected ability of the public to support such programs as are contemplated. . . . Consideration must also be given to what the future economic resources of a state are going to be; its population, the nature and extent of its agriculture and industry, and the wealth and income of its citizens."

Mr. Steele continued, "The job of making such a long-range plan is a tremendous one and can have far-reaching effects. It is sometimes apparent that those to whom the responsibility for preparing these long-range plans falls have entered upon their duties too lightly or without an intimate knowledge of what factual data they will need and where they can get them."

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KEEPS WORKING NIGHT AND DAY!

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Quickly and easily applied with varnish, or with the vacuum applicator or the roller type method of application. Comes in standard yellow, white, silver, red, green, blue and other colors. It eliminates the wrinkling or curling in handling in the shop because of its flat sheet form. For this same reason it stores extremely well. Convenient sheet form also expedites handling and cutting where small lots of signs are run off by direct screening.

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Being available in sheet form or made to your sheet size specifications, Reflectolite is ready to be applied by the roller or vacuum applicator method to any sign in your shops. Should you prefer to order ready made signs from us, simply give us full specifications. They are made to comply with the Manual of Uniform Traffic Control Devices in color, size and lettering style.

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CITY MANAGERS DISCUSS TRAFFIC

by S. E. VICKERS

Late last Fall in Coronado, Calif., a number of city managers, members of the International City Managers' Association, met to discuss traffic and parking problems. John Ames served as chairman, and James E. Reading, (Assoc. Mem. ITE) City Traffic Engineer of San Diego, as consultant. The group met with the full realization of the importance of parking and traffic congestion, and with the feeling that too little attention has been given this subject matter. It is well known that parking and traffic congestion is causing decentralization. It is forcing the metropolitan shopper to suburbs, and as a result, time and trade is lost and property values and resultant tax revenues reduced.

Traffic and parking problems become more acute as the city grows in population. Small cities give but little attention to the problem. As the city grows, diagonal parking is eliminated to eliminate traffic congestion. Parking meters are installed to provide curb parking spaces for customers. Stop signs, traffic signals, and street painting are provided to regulate the flow of traffic. As the city reaches a population of 50,000 to 100,000 it begins to analyze its traffic problems. The city, at this point, may employ a traffic engineer and a small staff. It may require a certain amount of off-street parking in connection with the construction of new business enterprises. As the city grows to a larger size, it finds itself with less parking area than it had before. It now eliminates parking on certain streets during hours of peak flow and establishes one-way streets to overcome congestion. It then considers the establishment of off-street parking areas and is confronted with such questions as , (1) How is it going to be provided, and (2) How are the off-street parking areas going to be financed.

Mr. Vickers is city manager of Vallejo, Calif.

Americans Like Cars

In considering the solution of this problem certain tendencies must be considered. The average American wants to take his car with him and will endure hardships to use it. The average American has his automobile firmly attached to the "seat of his pants". Individuals in smaller cities are less content to walk a few blocks than the individuals of the larger cities.

Some cities are using parking meter revenue to provide off-street parking facilities. A few cities are beginning to adopt regulatory ordinances for the regulation of private parking facilities.

In considering the solution of the traffic and parking problem, it is highly important that a sound traffic study be made. The facts must be gathered, analyzed and properly coordinated. Cities must not go blindly into street widening proceedings without analyzing the economic aspects of the problem, for it may be far cheaper to prohibit parking on the street and put the money which would be used for widening into off-street parking. By eliminating parked cars on a street a city might get one additional traffic lane. It is important to remember that the driving lane next to the parked cars is but 60% as effective for traffic movement as the lane nearest the center of the street.

The parking and traffic problems of the metropolitan area must be solved. In the final analysis the shopper, the merchant, and the taxing body are all damaged; all three must share the burden of providing adequate facilities for the movement and parking of vehicles.

Traffic Engineer's Quiz

by MARTIN C. STARK, *Junior Member, ITE*

Editor's Note: This is the first of a proposed series of annual interrogations designed to determine your ability to read and retain the articles in TRAFFIC ENGINEERING. Those with scores of 80 or more points should advise the Editor at 2312 N. Vernon, Arlington, Va.

THIS quiz is based on the twelve 1947 issues of TRAFFIC ENGINEERING. Please prepare an answer sheet with fifty numbered spaces. For each question you have a choice of several answers. Select the right one and place its number on your answer sheet. When you have answered the fifty questions, check your score against the answers on page 176 and credit yourself with two points for each correct answer. Obviously, criteria for judging the scores are limited but the following scale of performance is offered.

If you score between 85 and 100, you make the honor roll and deserve credit for reading TRAFFIC ENGINEERING carefully from cover to cover every month. If you score between 70 and 85, you are certainly an up-and-coming, well-informed traffic engineer. A score between 55 and 70 is not so good, but perhaps you are off form today. If you score below 55, don't be discouraged—maybe you could get a good score on a quiz in some other field.

You're off! No peeking.

1. One of these cities had a snowfall of about 110 inches each of the last two winters presenting a traffic problem worth writing about:
   (1) Duluth
   (2) St. Paul
   (3) Buffalo
   (4) Miami
   (5) Schenectady
2. Schemes used by states for marking center lines, lane lines, and barrier lines along pavements generally:
   (1) Conform to the standards of the A.A.S.H.O.
   (2) Call for the use of white lines
   (3) Call for the use of yellow lines
   (4) Include 18 or 20 different combinations
   (5) Call for yellow lines on bituminous pavement, black lines on concrete pavements
3. The Brooklyn-Battery vehicular tunnel now under construction will be the:
   (1) Longest underground highway in the world
   (2) Longest in the Western Hemisphere
   (3) Second longest in North America
   (4) Second longest in the United States
   (5) Second longest in the Western Hemisphere
4. An engineering report presented to the mayor proposed *all but one* of these improvements for New York:
   (1) Construction of 16 new parking garages throughout the city
   (2) Construction of a mid-town expressway along 30th Street
   (3) Installation of parking meters in mid-town and lower Manhattan
   (4) Limiting long- and short-haul bus terminals to four on the west side of Manhattan
   (5) Construction of an additional tunnel under the Hudson River
5. A survey of the Pittsburgh parking problem supports *all but one* of these statements:
   (1) Traffic in 1960 is anticipated at 50 per cent more than the 1941 level
   (2) Cruising traffic looking for parking places accounts for up to 17 per cent of traffic in the Golden Triangle
   (3) More parking spaces are needed for downtown workers than for shoppers
   (4) Most shoppers prefer to park their cars themselves rather than have them parked by attendants
   (5) It is recommended that 32 new parking facilities be constructed costing about 3½ million dollars
6. A recent survey in a number of cities in North Carolina has borne out the belief that generally the percent of through traffic at a city:
   (1) Is approximately in direct proportion to population
   (2) Increases approximately as the square of population
   (3) Is about the same regardless of size of city
   (4) Is approximately in inverse proportion to population
   (5) Follows no discernible pattern

7. National Safety Council statisticians studying the 1941 accident history on the Pennsylvania Turnpike have verified *all but one* of these statements:
   (1) The death rate for the Turnpike per 100,000,000 vehicle miles was lower by about 30 per cent than the 1941 rate for all rural highways in the United States
   (2) More than three quarters of the fatal accidents occurred in daylight
   (3) Despite the ideal physical characteristics built into the road certain types of accidents were actually more frequent than on other roads
   (4) A considerable number of collisions occurred at toll booths where cars failed to observe SLOW warnings
   (5) A large percentage of accidents resulted from tire failure at the sustained high speeds operated on the Turnpike

8. The Collier Committee is identified as:
   (1) A congressional sub-committee considering the federal aid program
   (2) A conference of transit company executives called to consider certain post-war problems facing the industry
   (3) A committee of traffic experts selected by **Collier's Magazine** to analyze for its readers the utility and safety features of freeways now contemplated
   (4) Another name for the National Committee on Uniform Traffic Laws and Ordinances
   (5) The California legislature's joint fact-finding Committee on Highways, Streets and Bridges

9. The maximum volume observed through the Holland Tunnel in terms of vehicles per hour per lane is about:
   (1) 1250
   (2) 1500
   (3) 1800
   (4) 2100
   (5) 2800

10. Studies on wear of tires have brought out *all but one* of these points:
   (1) Change in direction of a moving vehicle causes tire slippage
   (2) Slippage increases as the square of the vehicle speed
   (3) Proper banking of a curve reduces slippage
   (4) Trucks have a greater tendency to slip than passenger cars
   (5) Wear on curves averages 20 times the wear on straight roads

11. The Illuminating Engineering Society's new "Recommended Practice of Street and Highway Lighting, 1945" indorses *all but one* of these statements
   (1) The recommended foot candle measurements for most locations have been nearly doubled since the earlier code in 1940
   (2) New concrete streets should have 25% more light than macadam roads
   (3) The new code recognizes and classifies five types of light distribution of luminaires
   (4) Lighting at intersections should be equal to the sum of the lighting for the intersecting streets
   (5) Still higher intensities are recommended for complex intersections

12. The number of school buses in the United States used each school day of the 1946-47 season was about:
   (1) 12,500
   (2) 40,000
   (3) 80,000
   (4) 150,000
   (5) 315,000

13. Truck registrations in the United States during the first six months of 1947 were about:
   (1) 1,200,000
   (2) 3,750,000
   (3) 4,500,000
   (4) 5,700,000
   (5) 7,700,000

14. According to traffic trend data released by the Public Roads Administration, rural traffic in the United States during the first ten months of 1947 was about:
   (1) Ten per cent below the 1941 level
   (2) Equal to the 1941 level
   (3) Twelve per cent above the 1941 level
   (4) Twenty-five per cent above the 1941 level
   (5) Thirty-eight per cent above the 1941 level

15. The *airphibian* developed by Mr. Robert E. Fulton, Jr., is a:
   (1) Flying boat
   (2) New lighter-than-air passenger craft
   (3) Combination automobile and small passenger plane
   (4) "Buck Rogers" vehicle capable of traveling on land, water or in the air
   (5) Cub plane capable of making a nearly vertical landing in a normal-size back yard

16. The only state remaining without a driver's license law is:
   (1) Florida
   (2) Ohio
   (3) Vermont
   (4) Nevada
   (5) South Dakota

17. According to the National Safety Council, the largest city to complete 1946 without a traffic death was:
    (1) New Britain, Conn.
    (2) Wichita, Kans.
    (3) Watertown, New York
    (4) Newburyport, Mass.
    (5) New York City

18. The Model State Enabling Statute published by the Highway Research Board provides for public participation in the financing of off-street parking facilities by *all but one* of these methods:
    (1) General obligation bonds
    (2) Revenue bonds
    (3) Benefit assessments
    (4) General fund appropriations
    (5) Gasoline taxes

19. A Public Roads Administration study has shown that curb parking on an average downtown street reduces the capacity of the street by about:
    (1) 12 per cent
    (2) 20 per cent
    (3) One third
    (4) 45 per cent
    (5) 60 per cent

20. Among the most significant changes recently made in the manual on Uniform Traffic Control Devices for Streets and Highways are *all but one* of these:
    (1) More extensive standards for approach ends of islands
    (2) A comparison of relative advantages of fixed-time and traffic-actuated signals
    (3) New specifications for center lines and no-passing-zone markings
    (4) "Rounded" lettering for highway signs
    (5) New warrants for various treatments of railroad grade crossings

21. A forceful presentation of the case against toll roads by Public Roads Commissioner Thomas H. MacDonald was prompted by:
    (1) An article in the **Saturday Evening Post**
    (2) A proposed highway bill before Congress
    (3) A speech made by a prominent executive of an oil company
    (4) A statement issued by the American Automobile Association
    (5) A panel discussion at the Conference on Urban Problems sponsored by the United States Chamber of Commerce

22. The Minnesota supreme court ruled recently that:
    (1) Municipalities are exempt from the four cents a gallon state tax on gasoline used by city owned and operated vehicles
    (2) They are not exempt
    (3) They must pay half the tax
    (4) They must pay one cent a gallon
    (5) The tax law itself as presently worded is unconstitutional

23. The 94 pedestrian subways in Los Angeles were constructed at an average cost of about:
    (1) $2,000 each
    (2) 3,500 each
    (3) 8,000 each
    (4) $11,000 each
    (5) 15,000 each

24. The first statute in the country to ban new billboards in residential or rural areas was recently enacted by the state legislature of:
    (1) Maine
    (2) New Hampshire
    (3) Vermont
    (4) Massachusetts
    (5) Rhode Island

25. The War Department's 1946 annual report of its accident prevention program lists *all but one* of these unsafe driver practices as most responsible for the army's motor vehicle accidents:
    (1) Speeding
    (2) Following too close
    (3) Overtaking and passing with insufficient sight distance
    (4) Unsafe backing
    (5) Assuming right of way

26. The National Conference on Street and Highway Safety was organized in:
    (1) 1920
    (2) 1924
    (3) 1934
    (4) 1938
    (5) 1946

27. The standards set up for school buses by the National School Bus Conference provide *all but one* of these:
    (1) The bus will be chrome yellow
    (2) A semaphore will display the STOP command only when needed
    (3) An emergency door is required
    (4) The windows can be raised only nine inches
    (5) All buses will be built according to precisely the same specifications

28. It is reported that at the end of 1946 the total number of cities operating parking meters was about:
    (1) 250
    (2) 450
    (3) 610
    (4) 925
    (5) 1450

29. The average mileage per motor vehicle during the year 1946 was:
    (1) 5,500
    (2) 8,200
    (3) 10,300
    (4) 14,000
    (5) 16,300

30. The "Helmholtz Reciprocal Relation" is a principle:
    (1) Used in the new Night Visibility Meter
    (2) Used in the Electro-Matic speed meter
    (3) Used in the determination of proper superelevation
    (4) Relating to reciprocity in state motor vehicle regulations
    (5) Pertaining to the relationship between roadway capacity and vehicular headways

31. The DO NOT ENTER symbol in the international sign system is:
    (1) A black cross on a white background
    (2) A diamond-shaped yellow sign with a small black circle in the center
    (3) A solid white, octagonal sign
    (4) A yellow circle with a black "plus sign" in the center
    (5) A red disc with a white or pale yellow horizontal bar

32. The *Institute of Traffic Engineers* held its 1947 annual meeting in:
    (1) Columbus
    (2) Chicago
    (3) Detroit
    (4) St. Louis
    (5) Atlantic City

33. Because a 1½-mile portion of a proposed freeway for U. S. Highway 75 through Houston involves crossing 19 streets just south of the business district at too great a cost for consideration at this time it is proposed to:
    (1) Change the route so as to completely bypass the area in question
    (2) Depress the main highway for the 1½-mile section
    (3) Postpone the entire project until more funds are available
    (4) Develop a system of four one-way streets with provisions for connecting to a possible future elevated freeway
    (5) Terminate U. S. Highway 75 at Houston

34. At the 18th Annual Meeting of the *Institute of Traffic Engineers*, Wilbur Smith reported that the total membership had increased approximately 15 per cent during the year to a current figure of:
    (1) 261
    (2) 373
    (3) 491
    (4) 586
    (5) 914

35. Local sections of the *Institute of Traffic Engineers* include *all but one* of these:
    (1) New York
    (2) Washington
    (3) Western States
    (4) Texas
    (5) New England

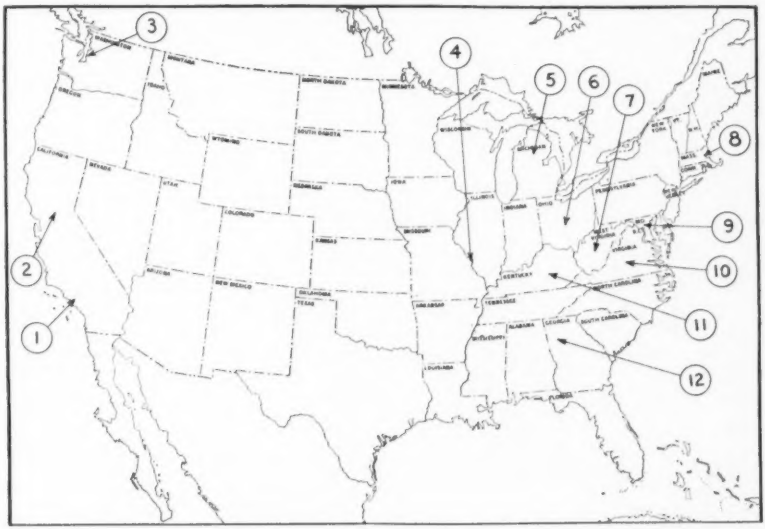
36. Historian for the *Institute of Traffic Engineers* is:
    (1) Bob Hope
    (2) Herbert Marshall
    (3) Jack Benny
    (4) Robert Taylor
    (5) William Powell

37. The present Editor of TRAFFIC ENGINEERING is Robert:
    (1) Burrage
    (2) Dunn
    (3) Holmes
    (4) Mitchell
    (5) Swain

38. In a report on the results of a recent survey by Canadian Opinion Research, the number of U. S. motorists visiting Canada annually is stated to be more than:
    (1) 10,000
    (2) 50,000
    (3) 100,000
    (4) 500,000
    (5) 1,000,000

Referring to the map of the United States, select the correct location for each of the following events and indicate location number on your answer sheet.

39. Extensive skidding and traction tests were made here in 1946 under the sponsorship of the National Safety Council
40. A four-level interchange is planned here for the crossing of two major freeways
41. In this **state** two cities are building municipally financed and operated parking garages, reported to be the first of their kind in the nation
42. In a case cited as indicating a significant trend, the Court of Appeals of this **state** found that the provision of public parking lots for automobiles constitutes a "legitimate municipal purpose"
43. The highway department of this **state** has been cited as using sandbags to facilitate experimentation in channelizing intersections
44. A member of the Public Roads Administration made an interesting study at this point comparing Independence Day traffic in 1927, 1942 and 1947



Directions: Each of the six pictures on the next page is identified by one of the phrases below. Write on your answer sheet (opposite the number of each picture) the number of the correct phrase.

(1) Editor of TRAFFIC ENGINEERING
(2) Immediate past president of the ITE
(3) First full-time executive secretary of the ITE
(4) An executive of the Chrysler Corporation featured as a speaker at the 1947 annual meeting of the ITE
(5) Director of the Yale Bureau of Highway Traffic
(6) Commissioner of the U. S. Public Roads Administration
(7) Managing director of the new Inter-Industry Highway Safety Committee
(8) A pioneer in the traffic field who has been on the staff of the Port of New York Authority for the past 24 years
(9) Present president of the ITE
(10) One of the founders of the ITE and now an executive in the American Automobile Ass'n.
(11) Has been traffic engineer of a western city for 28 years
(12) Has established a consulting firm with headquarters in Philadelphia.

45.

46.

47.

48.

49.

The TRAFFIC TEST replaces PERSONALITIES in this issue.

PERSONALITIES will be resumed in the February issue.

50.

TUTHILL GUARD RAILS

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Transit Needs In Richmond, Virginia

by WARREN R. POLLARD

RICHMOND is no different from many of the other large cities in the United States, in that it is suffering from a municipal disease known as "traffic congestion". This municipal ailment caused Richmond to be not unlike the man suffering from hardening of the arteries—its circulation is being choked. The lifestream of man is the circulation of blood, but the lifestream of a city is the orderly, swift and even movement of people.

The Virginia Transit Company has no panacea for traffic congestion. The company's goal is improving and modernizing Richmond's transit service, however, can and will be of great assistance in correcting this municipal ailment. The entire modernization program broadly, that of substituting a combination fleet of sleek new trolley coaches and buses for the noisy and obsolete street cars and re-arranging the present routes to meet the needs of a growing city—is designed to give swift, convenient and good transit service to all of Richmond. Further, this modernization program has been conceived on the principle of moving people, rather than vehicles.

Street Car Through

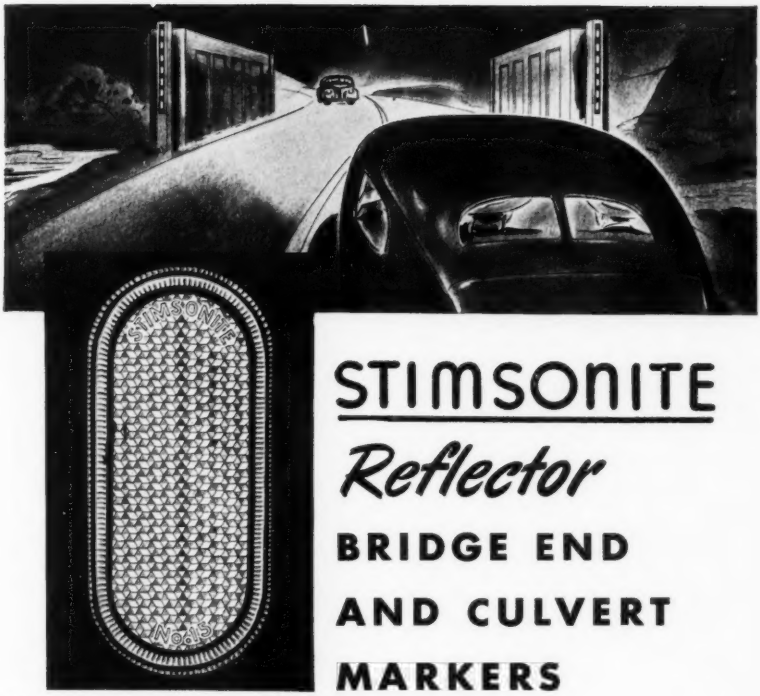
The street car as a means of public transit in cities of less than one million population is through. Every public transit company in the nation is making plans for abandoning street car operations for the more modern buses and trolley coaches. In a matter of ten years, street cars will be in operation in less than a dozen cities in the United States. Among the larger cities presently abandoning street cars are Atlanta, Ga., Chattanooga, Tenn., New York City, Oakland, Calif., Detroit, Michican, Portland, Oregon, Columbus, Ohio, Cincinnati, Ohio, Louisville, Kentucky, and Memphis, Tenn. Yes, in a few short years the "Clang, Clang Goes The Trolley" will be only a song and a memory.

Richmond's growth during the past twenty years—the last time any route changes were made in the present transit system—has been enormous. Population shifts have been experienced, new areas have been developed for housing, and the city has expanded its borders. But all of these changes have been brought about in the outlying areas where new wide streets and avenues were built to take care of the heavy flows of traffic. Traffic generated by these new developments comes into the downtown sections where the same streets are used today as were used years ago when the automobile was in its infancy and the horse-drawn wagon and buggy provided most of the means of moving people and goods. But these streets are not as wide as those of yesteryear because parking has made them smaller.

Eliminate Parking

It would appear then that with streets becoming smaller because of parking, that a possible solution lies in limiting or prohibiting parking on all of the downtown thoroughfares. This regulation would undoubtedly re-

Mr. Pollard is President of the Virginia Transit Company of Richmond, Virginia.



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SIGNAL SERVICE

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lieve the situation, because two additional lanes would be opened for the movement of traffic. But where would we put the automobiles? Our existing off-street parking facilities are now jammed to overflowing. But we do have authority to create a parking commission to explore the solution to the parking problem.

Agreed that something must be done quickly, we must look at our basis of facts and then proceed. The facts known are : (1) That streets are relatively permanent and there will probably be only a limited expansion of streets in the next decade; (2) That only a few localized major street changes may come about in the course of public works or urban rehabilitation programs; (3) That express-ways, when built, will constitute but a small fraction of the total mileage of city streets; (4) That existing streets will have to accommodate the bulk of the movement of people and goods in Richmond.

Street Use

A first thought to come from going over these facts is that our course of solving our municipal disease is the efficient and proper use of our existing downtown street space. Strict regulation, (and please note the word strict) of off-street parking and the establishment of more off-street parking facilities, as previously indicated, will open more lanes for traffic movement. But will not these newly opened lanes be absorbed when automobile production begins to catch up with the demand? Already we have reports that the monthly sales of new automobiles is surpassing those of the same months in 1940. So it would appear that there is already a demand for new lanes for traffic movement before the lanes are actually opened.

Now let us change our thinking from the movement of traffic to the movement of people — the actual quickening of the lifestream of the city. Let us think in terms of moving with one vehicle, about fifty people, the job that requires 29 automobiles, occupying about one city block of traffic. A person when riding in a transit vehicle uses only one-seventh of the amount of street space a person requires when riding in a private automobile. A street with two lanes for automobiles and one lane for a transit line can move 16,630 people an hour, but only because 86 per cent of these people are being transported in the public transit vehicle.

Curb Loading

With our thought so pointed, we direct our attention to the Virginia Transit Company's modernization program. An entire statement of the program would require more than the allotted space. But the specific goals may be discussed because they are our main interest. First, the removal of street car tracks from the middle of the streets will speed the movement of traffic. Transit vehicles will take on and discharge passengers at the curb, permitting automobiles to pass them rather than wait for the vehicle to move on as is now necessary with street cars. This one advantage of buses and trolley coaches alone will speed traffic throughout the city.

For instance on Broad Street, at least three and possibly four lanes for the movement of traffic will be opened when the use of street cars is abandoned. The bottleneck created at each downtown intersection by the in-the-street loading zone, will open Broad Street for more rapid movement of traffic at each street crossing. Important side streets, such as Seventh and Eighth Streets, will be open for greater movement of all types of traffic with the removal of street cars.

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running through our financial section, also will be opened. The same that holds true for the Broad Street intersection bottlenecks, obtains on Main Street.

At this point a conclusion might be reached that the mere elimination of street cars and the substitution of buses and trolley coaches will solve the traffic problem. This is far from correct. It is true that using the existing transit routes and operating the new type of vehicles with the latest developments will speed service and open lanes for the movement of more traffic. But to eliminate street cars would be doing only half the job.

The VTC program for giving Richmond the finest transit service in the United States is aptly named. It is called a "modernization program". Modernization means "to render modern; make conform to present usage, style, taste, etc." Now to modernize the transit system here, we must go further than to install new equipment and scrap the obsolete street car. We must render modern from beginning to end. Thus we must bring about changes that will give Richmond a transit service that will be good enough to cause present automobile riders to leave their cars at home and use the transit lines for in-town transportation.

Express Service

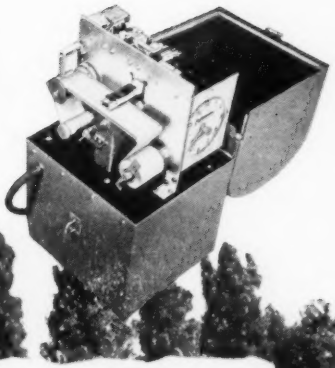
Already some of the modern changes have been made. Express service has been put into operation on the Chamberlayne bus line, affording patrons of that section a more convenient and time-saving transit service. Improvements have been made in many of the "behind-the-scene" methods of operation, such as the installation of an automatic bus washer to provide cleaner vehicles, a highly systemized plan of vehicle inspection and maintenance to afford even greater safety and rereduce service interruptions, schedule study and drafting and radio car patrols by roving supervisors.

An origin and destination study of the riding habits of Richmonders has been started and will be completed later this year. From the answers to two simple questions—the address the rider is traveling from and the address he is traveling to—we will ascertain exactly where transit service is needed and the amount of service required to meet the demands of the public. Even more important is the fact that the information comes from the riders themselves. This is a highly important survey because we will learn just where to route new bus and trolley coach lines and whether the existing routes meet the demands of the section served.

The over-all plan of modernization, as far as routing is concerned, will follow generally the recommendations in the Harland Bartholomew Master Plan for the Physical Department of the City. His recommendations were based on population shifts and other factors ascertained in the study of Richmond. Naturally some deviations from the Master Plan will be made in accordance with the findings of the origin and destination study.

Further, the modernization plan will follow other recommendations made in studies of the transit system in that direct routing will be inaugurated wherever possible and faster service, not in the terms of miles per hour, but, free from turning movements, too many stops and other impediments, will be provided.

ARE YOU PLANNING AHEAD?



Many state, highway and county engineers are not only "planning ahead" for the construction of new highways and streets, but have already, through the aid of Streeter-Amet Traficounters, made extensive surveys . . . and are ready to put into operation a complete construction program, as soon as facilities and materials are available.

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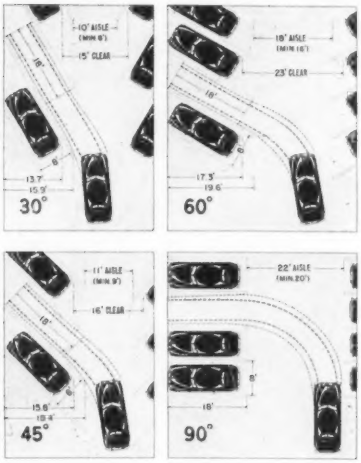
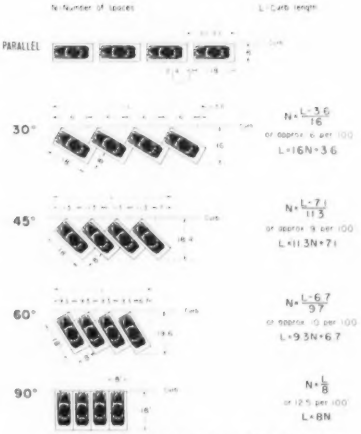


Courtesy, Public Roads Administration

SPACE AND AISLE REQUIREMENTS FOR PARKING AT VARIOUS ANGLES



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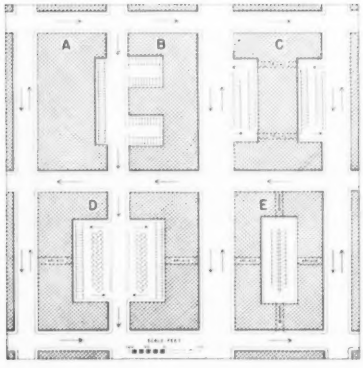
ANGLE PARKING



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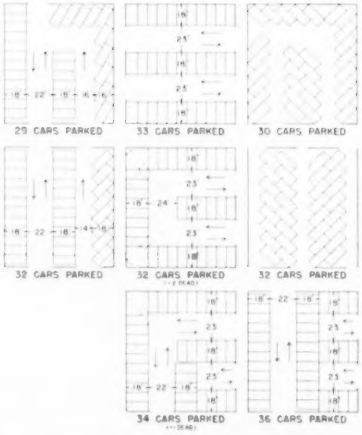

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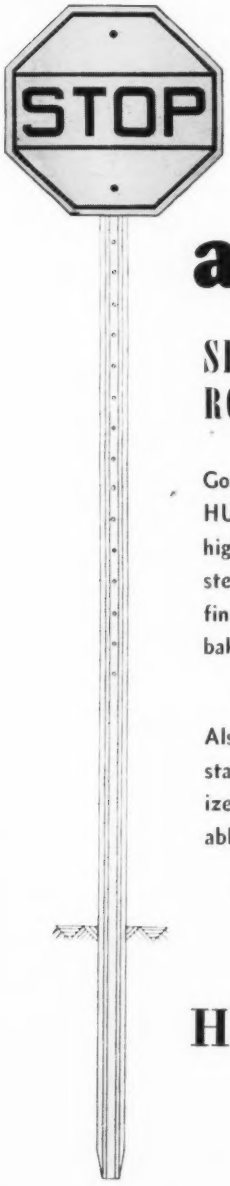
EIGHT METHODS OF LAYING OUT AN AREA 90 FT. x 100 FT. FOR DRIVER PARKING

(Showing several conditions as to possible exits)



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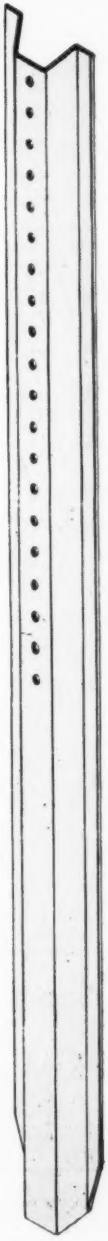

Activities . . . .

December 13, 1947

Honorable Secretary of the Army
Department of the Army
Pentagon Building
Washington 25, D. C.

Dear Mr. Secretary:

On behalf of the membership of the Institute of Traffic Engineers its Board of Direction, in regular session December 5, 1947, took the following action:

"Noting that the Chief of Transportation has publicly expressed the desire for closer relationship with the transportation industry to help study the problems peculiar to the Transportation Corps, Department of the Army, and advise on their solution, the Institute of Traffic Engineers whose members are engaged in highway traffic planning and operations, and many of whom had responsible positions in the direction and management of civilian and military transportation functions during the last war, in continuing interest to be of service and assistance to the Transportation Corps, does hereby offer its cooperation and services at any and all times to the Chief of Transportation."

We hope that the Chief of Transportation will again feel free to call upon the Institute of Traffic Engineers or its individual members for professional assistance as was done during the last war.

Yours very truly,
ROBERT A. MITCHELL
President, ITE.

ELECT NEW MEMBERS

At the Board of Direction meeting on December 5, the following members were elected:

New Member: Roy A. Flynt, State Director, Division of Highway Planning, State Highway Department of Georgia, 2 Capitol Square, Atlanta 3, Georgia.

New Associate Member: Edward Kidwell, Assistant Traffic Engineer, City of Houston, Texas. Send Mail: 709 Quitman Street, Houston 6, Texas.

New Junior Members: Arthur C. Gibson, Assistant Civil Engineer, Traffic Engineering Bureau, 112 E. Jefferson Ave., Detroit 26, Mich.; Stanley T. Siegel, Associate Traffic Engineer, Division of Traffic Control & Regulation, State House, Trenton, New Jersey.

Transfers—Associate to Member: Louis E. Bender, Paul L. Ristroph.

Editor's Note: Secretaries of local sections are requested to submit their reports by the 15th of the month for publication in the following month's issue.

SECRETARY'S COLUMN

It is encouraging to note the willingness of ITE members to serve on our several important committees. Your National Headquarters has received letters from a large majority of approximately 280 members invited to serve. If this is an indication of the cooperative spirit of the entire membership, we regret that each and every one of you can not be placed on a committee of your choice. In most instances we were able to fit the square pegs in the square holes this year and conform with the expressed desires of individual members. Committee chairmen have already begun their activities for the year, many being a promulgation of work started last year. We are looking forward to a highly successful "committee" year . . . . We are happy to note the continued interest of the Department of the Army in the profession of traffic engineering. We have recently received a renewal of several hundred subscriptions to the magazine. As noted in this column in the October issue, another class of hand-picked Army traffic and transportation personnel is scheduled for a 16-week training course at the Yale Bureau of Highway Traffic. Another indication of our continued cooperation with the Army is shown by a special letter to the Secretary of the Army from President Mitchell (reproduced elsewhere in this issue) offering the services of the Institute to the Chief of Transportation. This letter was forwarded to the Secretary of the Army following official

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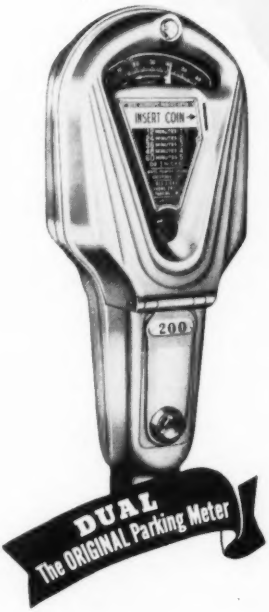

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WHEN IT COMES TO CONTROLLING PARKING YOU CAN DO IT BETTER WITH **DUALS**

Board of Direction action at the last meeting, December 5, 1947. Still another result of our friendly relationship with the Army is the increasing number of inquiries from Army personnel relative to membership in the Institute. We hope that this pleasant association with the Army will be expanded at an early date to include the Air Forces and the Navy. Both of the latter services are now conducting successful traffic safety campaigns and have expressed considerable interest in traffic engineering.

ROBERT S. HOLMES

I T E PERSONALS

JAMES E. READING, Assoc. Mem., recently participated in the "Traffic and Parking" discussion at the 33rd Annual Conference of the International City Managers' Association, held in Coronado, California. During the three-hour panel on traffic, Jim was given an opportunity to make a few remarks which consisted of an outline of traffic engineering, its methods and accomplishments, the type of individual required for such an assignment, and the relative importance of traffic engineering in the municipal administrative set-up. There was a tremendous interest in the remarks and in Mr. Reading's contributions to the panel discussion.

In November **KIRK REID** (Affil.) was on a western trip during which he gave addresses on the subject of "New Developments in Lighting for Streets and Sports" at meetings in Denver, Salt Lake City, Ogden, Butte, Boise, Vancouver, B. C., San Francisco, and Los Angeles. The meetings in Denver, Salt Lake City, Vancouver, and Los Angeles were under the auspices of the Illuminating Engineering Society. The others were sponsored by the local electric utilities. One of the items of particular interest in all these meetings was the study conducted jointly by the Illuminating Engineering Society and the National Shade Tree Conference of long-range and immediate methods of minimizing conflicts between street trees and street lighting. A paper on this subject was presented at the ITE meeting in Chicago a couple of months ago by R. J. Diefenthaler, who is now Lighting Engineer of the G. E. Lamp Dept. Office in Chicago.

WM. E. BILLINGS (Assoc.) is director of the traffic department of the Cleveland Motor Club. Mr. Billings was formerly associated with the Liberty Mutual Insurance Co. of Boston.

RUSS HARRISON (Assoc. Mem.) was recently licensed as a professional engineer in Michigan.

The condition of **GRAHAM COLE** (Mem.) is reported as "improved".

EARL REEDER, (Mem.) director of Traffic and Transportation, City of Miami, has submitted his first annual report, a publication of 17 pages tracing the year's developments and future programs. The report reflects credit on Mr. Reeder and his associates.

AT WASHINGTON MEETING

In attendance at the 27th Annual Meeting of the Highway Research Board held in Washington, D. C., December 2 to 5, were ITE Vice-Presidents Harry Neal and Wilbur Smith, Board Members Nathan Cherniack, Bruce Crandall and Grant Mickle, and Secretary-Treasurer Fred Hurd.

Mr. Neal, Chief Engineer, Division of Traffic and Safety, Ohio State Highway Department, is a member of the Highway Research Board's Traffic and Operations Department; Mr. Smith, Associate Director of the Bureau of Highway Traffic, Yale University, is Chairman of the Board's Traffic and Operations Department and a member of the special committee on Highway Lighting Research; Mr. Cherniack, economist for the Port of New York Authority, is a member of the Department of Economics, Finance and Administration and chairman of the department's project committee on Factors Affecting the Distribution and Generation of Highway Traffic, is a member of the Traffic and Operations Department, and on three project committees; Mr. Mickle, Director, Traffic Engineering Department, Automotive Safety Foundation, is a member of the Traffic and Operations Department and a member of the project committee on Origin-Destination Studies.

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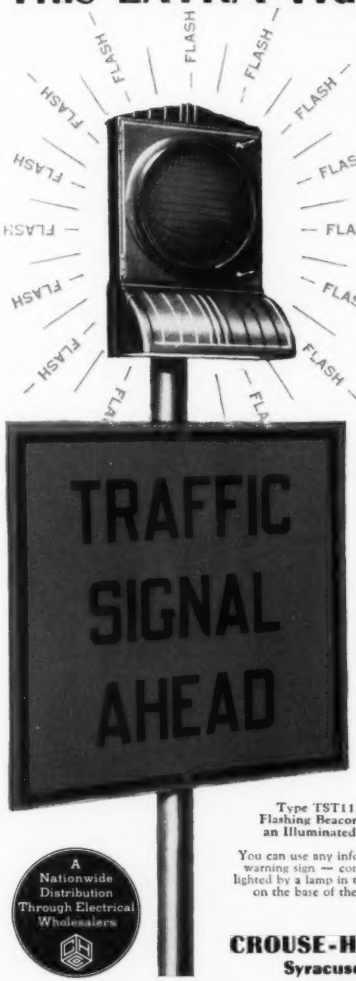

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flashing beacon with an illuminated sign acts like a **powerful brake** that **slows down** traffic approaching dangerous intersections.

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There are dangerous intersections in every signalized area where there is a definite need for the advance warning that this signal gives. Typical examples are: an intersection where the approach is around a curve or over the crest of a hill; where high speed main arteries are crossed by secondary roads; where main highways pass through small villages; and where main highways enter suburban or urban communities. It is especially important to have an advance warning beacon if there is a confused background of red advertising signs at the intersection.

Go over the intersections in your area and check the ones where this Crouse-Hinds warning beacon should be installed to reduce accident hazards and save lives. In this way you can prevent the tragedies that are caused by the driver who "didn't see the signal in time to stop".

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Flashing Beacon with
an Illuminated Sign

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and former Connecticut State Police officer, is the Institute's new director of training.

Mr. O'Connell succeeds Arthur R. Forster, who resigned December 1 to enter private business after an 11-year affiliation with the Institute and Traffic Division of the International Association of Chiefs of Police.

SECTION NEWS

WASHINGTON SECTION

At the December 3 meeting, the Washington Section entertained more than 45 visiting traffic engineers, most of whom were in the Nation's Capitol for the 27th Annual Meeting of the Highway Research Board. Included were 18 members of the Yale Bureau of Highway Traffic Student Chapter and six officers and directors of the Institute.

Some 70 members and guests, representing 18 states and the District of Columbia, heard two interesting talks on the subject of "Traffic Engineering in Airport Design and Operation" by Edward G. Wetzel and Louis E. Bender of the Port of New York Authority. Mr. Wetzel gave some background on the various work engaged in by the Port Authority including its arrangements on June 1 of this year to operate under a fifty-year lease New York's LaGuardia and International (formerly Idlewild) airports and a more recent agreement involving the operation of the Newark airport.

Mr. Bender, who is closely connected with the Port Authority's airport operations, presented an interesting review of some of the traffic and parking problems confronted at the LaGuardia Field.

The meeting closed early so that all who wished could attend the evening traffic sessions at the Highway Research Board.

FLORIDA SECTION

The Florida Section was organized December 8, 1947. Of its activities, Earl Reeder reports the following:

Several changes were made in the constitution and by-laws. Ed Friedman, the new Secretary-Treasurer, will shortly furnish a copy of the revised constitution and by-laws.

We adopted a Section authorizing **Local Affiliates.** The following two paragraphs may be of interest to you concerning the restrictions that we impose on this classification:

"Persons who are engaging in types of work which are recognized as qualifying experience for admission to corporate membership in the Institute of Traffic Engineers, but who have not yet obtained adequate experience for such membership, may be admitted to the Section as **Local Affiliates.** They shall have all of the privileges of membership in the Section with the exception of holding elective office and voting on matters pertaining to the relation of the Section to the Institute of Traffic Engineers."

"Admission as a **Local Affiliate** shall be made upon application containing a statement of the applicant's professional training and experience and upon affirmative action by the Board of Direction. Such applications shall be on a form prescribed by the Board of Direction. The applicant shall furnish as references the names of three members of the Institute of Traffic Engineers to whom he is personally known. An application for admission as **Local Affiliate** shall contain the applicant's statement of intention to apply for the appropriate grade of membership in the Institute of Traffic Engineers as soon as he has accumulated a sufficient amount of qualifying experience. Failure to make such application when in the opinion of the Board of Direction of the Section he has qualified to apply, shall terminate the status of **Local Affiliate.**"

We believe that this will provide a good definition of the meaning of this **Local Affiliation** and that it will bring men who have an ambition to become Members of the Institute into a good professional relationship and atmosphere which will help them to develop toward proper qualifications for ITE Membership.

Bob Grunow, the new vice-president of the Section, has had quite a broad experience in traffic engineering in various parts of the country.

Ed Friedman, the new secretary-treasurer, was recently elected president of the Miami Section of the American Society of Civil Engineers. Last year he was the president of the Florida Engineering Society. He has formerly been a member of the Florida State Board of Engineer Examiners.

Since our membership is divided into two groups located some 500 miles apart and our Local Affiliates are likely to come mainly from these two sources, we authorized the Board of Direction to appoint committees for carrying on local activities in the name of the Florida Section in Tallahassee and Miami.

WESTERN SECTION

The following letter was recently sent to Western Section members by F. M. Carter:

"You have elected me to serve as the first President of the Western Section so Mr. DeYoung, Chairman of the Election Committee, has informed me. I deeply appreciate this honor.

"A meeting will be called as soon as possible to determine policies and establish the activities of the Western Section.

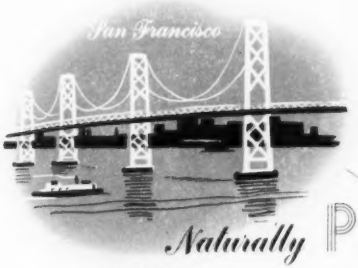
"We might consider committees and activities similar to the parent organization for the Western Section can be of much assistance in research and study to the national officers and committees. This, of course, is a subject we will discuss at our first meeting.

"Anticipating that we will name committees and develop a program, I shall appreciate your suggestions. Will you write to me, and with your suggestions indicate the committee or activity in which you feel you can best serve? To make our section successful I believe every member must take an active part.

"News of interest will be issued in bulletin form from time to time. This will take your cooperation. Keep me informed. No doubt you know of the new institute of traffic engineering being set up in the Department of Engineering at the University of California. We should stand ready to assist in the development of this program.

"The Western Section should grow in membership, present members should be on the alert for qualified applicants. If you do not have application blanks ask for them. We should have every Western traffic engineer in ITE.

"May I have your early reply. I know you are as anxious as I am that the Western Section of ITE be an effective and influential force. Cooperative effort will do it."



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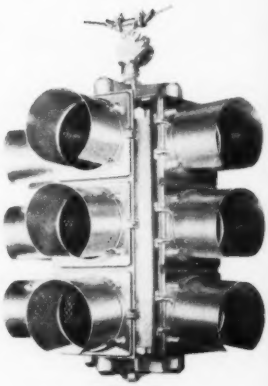

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